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ROTUNDA

the magazine of the Royal Ontario Museum

Stars Over China:

a new show at the McLaughlin Planetarium

Architectural drawing in Quebec City

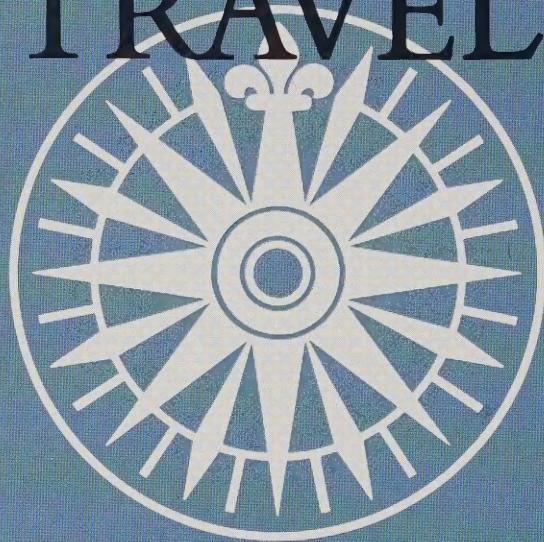
An ichthyological expedition to Fiji

Late Byzantine painting in the ROM

Book reviews



ROM TRAVEL



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ROTUNDA

the magazine of the Royal Ontario Museum

Volume 16, Number 3, Fall 1983

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Cover: Ancient sundial in the Forbidden City, China. Unlike Western sky watchers, the Chinese aimed the base plate of their sundials toward the celestial equator. See page 6. Photo: Paul Deans.

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Digging in the Archives

Bill Roedde

WHAT do you expect to find in the Museum archives? History, of course, and plenty of it. But there is more than correspondence and memoranda, exhibition plans and building blueprints. Much of the hope, work, talent, achievement, and even troubles of the people who built the ROM are in the files. And let's not forget the bowling trophy presented in the 1930s by the chairman of the board.

Early photographs? Yes, we have a few dating back to the establishment of the ROM in 1912 (first meeting of the board) and 1914 (opening of the west wing). Most are posed pictures of leading Museum people and don't give much information about the ROM. But when I gaze at these portraits of solemn and usually bearded men, I am irresistibly reminded of one particular Museum story. Apparently the first members of the board were in the habit of meeting in the late afternoon and concluding their deliberations with a cup of tea and a piece of cake; Miss English, secretary in the Royal Ontario Museum of Archaeology in the 1920s, was expected to obtain the modest refreshments. But after one meeting she was told never again to buy cake with sticky icing because, in her words: "Most of the trustees had beards, and got all gummed up!"

While the photographs from the 1920s are largely formal portraits, most of the ones from the 1930s are of science galleries and field trips. From the 1950s and 1960s we have a large collection recording receptions, exhibitions, and dances including the festive ROMARAMA evenings, which suggests a trend to a somewhat less solemn style in the Museum, at least as perceived by our photo-

Some of the "bearded men" standing at the door of University College, University of Toronto, in 1912. Left to right: Sir William Meredith, Sir Robert Falconer, Dr. James Brebner, and Sir Edmund Walker.

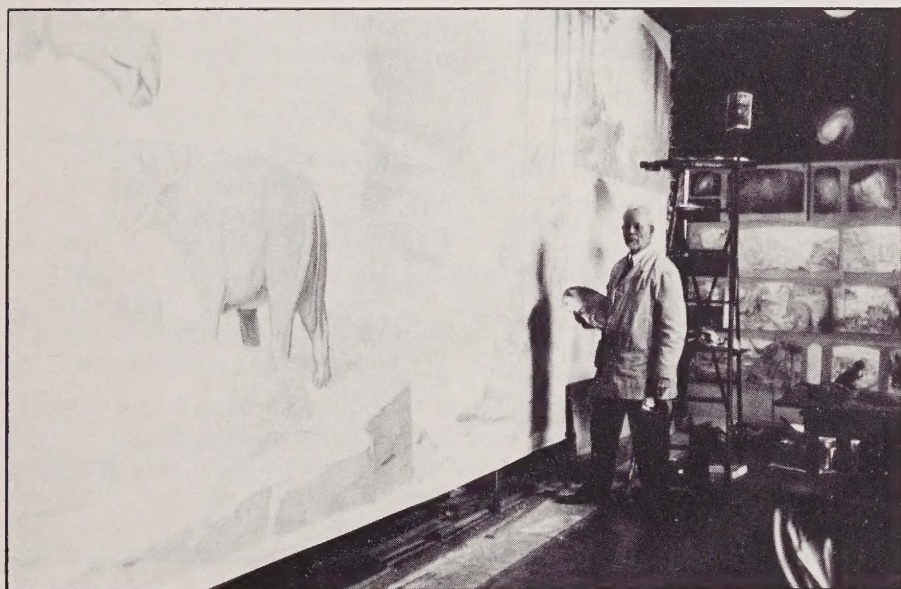




A 1914 photograph of the Royal Ontario Museum of Archaeology's first guards, carpenters, and a cataloguer, Miss Mary Hand.

graphers. And there is a mixture of the serious and the humorous in these headlines from seventy years of newspaper stories about the ROM:

- 1914 MAGNIFICENT MUSEUM OPENED BY GOVERNOR
- 1920 MUSEUM GETS THE DINOSAUR
- 1923 PHARAOH'S CURSE ALL BOSH. Mummies of ROM
 Never Hurt Anybody
- 1937 Ancient Romans "Just Folks"
- 1943 Even Owls Go Crazy, Just Like Some People
- 1946 She's guardian of mummies and knows all the answers
- 1959 Museum Moving Big Ming Tomb Outdoors
- 1962 MUSEUM'S HALF-CENTURY OF SEARCH AND RESEARCH
- 1967 NO WONDER YEN LO'S MAD,
 HE'S STARVING AT THE MUSEUM
- 1968 Museum bash gets it \$12,000
- 1977 Fossilmobile from "Flintstone" era
- 1981 World's smallest fish found by ROM



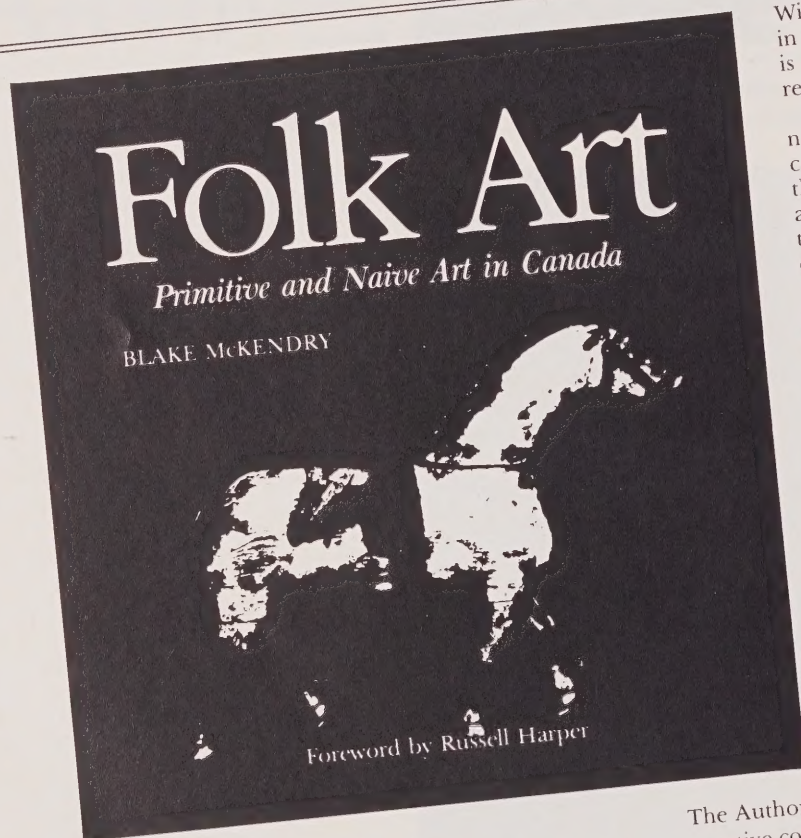
George A. Reid, artist, working on a mural for the old invertebrate palaeontology gallery. The 34-panel mural was completed in 1938.

Folk Art

Primitive and Naive Art in Canada

By Blake McKendry

Introduction & foreword by Russell Harper



With public interest increasing each year in the field of antiques and collectibles, it is only natural that folk art should now receive the attention it so richly deserves.

However, with this increased awareness various difficulties have arisen concerning terminology, classification and the use of descriptive terms to describe and catalogue these beautiful works. Even the term itself has not been clearly identified. Until now.

FOLK ART sets out a definitive guide to this exciting and historic artform. By defining specific categories of folk art, the author discusses each branch in separate chapters, illustrating the best known and most representative pieces by category.

To make this book as comprehensive as possible, the author has also included a checklist of prominent folk artists in Canada, as well as an extensive bibliography and detailed notes on each piece illustrated.

FOLK ART therefore is not only an "artbook" and collector's guide; it serves as a beautiful introduction to this fascinating field, and preserves a valuable part of the heritage of North America.

Folk Art
\$39.95 cloth
Fully Illustrated
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**METHUEN
PUBLICATIONS**

The Author
Blake McKendry has been an active collector and dealer of folk art for over 25 years. He has acted as a consultant to the National Museum of Man in Ottawa, and is acknowledged as one of the leading furniture collectors in this country. As well as being a consummate expert in the field of antiques and folk art, the author is also an accomplished writer and photographer. He has illustrated several books on antiques, and contributes regularly to periodicals dealing with the antique and collectibles market in Canada.

Museums other than the ROM are also the subject of amusing comment. In his address at the opening of the enlarged ROM on 12 October 1933, Dr. Herbert Bruce, Lieutenant Governor of Ontario, recalled: "It was not until 1682 that the first surviving scientific museum was established. This was the Ashmolean Museum at Oxford. Its nucleus was the private collection of Elias Ashmole, who wrote in his diary on February 17, 1683: 'The last load of my rarities was sent to the barge, and this afternoon I relapsed into the gout'." Later Dr. Bruce cited an advertisement from the printed catalogue of a London museum of the early 18th century:

Monsters of all sorts here are seen
Strange things in Nature as they grow so
Some relics of the Sheba Queen
And fragments of the famous Bob Cruso.

Though Museum life has its lighter moments, not many of them are recorded in the archives. When Helen Downie was secretary to the Museum Board in the 1950s she kept a file labelled "Letters Funny". Here is one:

Sir: Did you need for your Museum a living or dead mud turtle of about 30 lbs? I caught one last week but now I keep only the shell. Tell me if you want it living or not and how you will pay me for. I will try to catch another one this week.

And here's another:

In connection with my vocational guidance course . . . I wish to obtain all available information on Archaeology: its history and importance, working conditions, qualifications, preparation needed, opportunities for advancement, remuneration, and how to get started in this profession; also a list of advantages and disadvantages.

A clear and earnest request for information, you say, surely deserving a reply? Quite so, but unfortunately it included no date, name, or address.

In December 1933, the staff of the Royal Ontario Museum of Archaeology got together to celebrate Christmas and the reopening of the enlarged Museum. Miss English—soon to be Mrs. S. W. Clarke—retired at that time and an unknown poet produced some verse for the occasion:

Miss English and Preparator
Stood by the shipping door.
They wept like anything to see
The boxes pile the floor.
"If seven trustees for seven hours
Cabled to Bishop White,
Do you suppose," Miss English said,
"He would perceive our plight?"
The preparator said nothing but
"These lids are very tight."
"Oh vases," then Miss English cried,
"At last your journey's done.
So far by sail, so far by rail
Through snow and rain and sun.
Shall we remove your wrappings now?"
But answer came there none.
And this was scarcely odd because
They'd broken all but one!

I have found a number of poems in the Museum archives, but only "Miss English" do I find myself remembering, like a well-loved old song. Some people might say that broken vases should not be the subject of unseemly levity; maybe not, but I am glad that the poem survived to find a place in the archives. Even archivists need a chuckle now and then.



Opening night of the ROM's "Mask Show" in 1959: Mr. and Mrs. H.M. Turner greeting Mrs. Nathan Phillips, wife of Toronto's mayor.



Mr. H.M. Turner receiving from Miss Mary Pickford, Toronto-born movie actress, a needle-point picture made by H.M. Queen Mary. 17 June 1963.

Bill Roedde is the ROM archivist.

Stars Over China

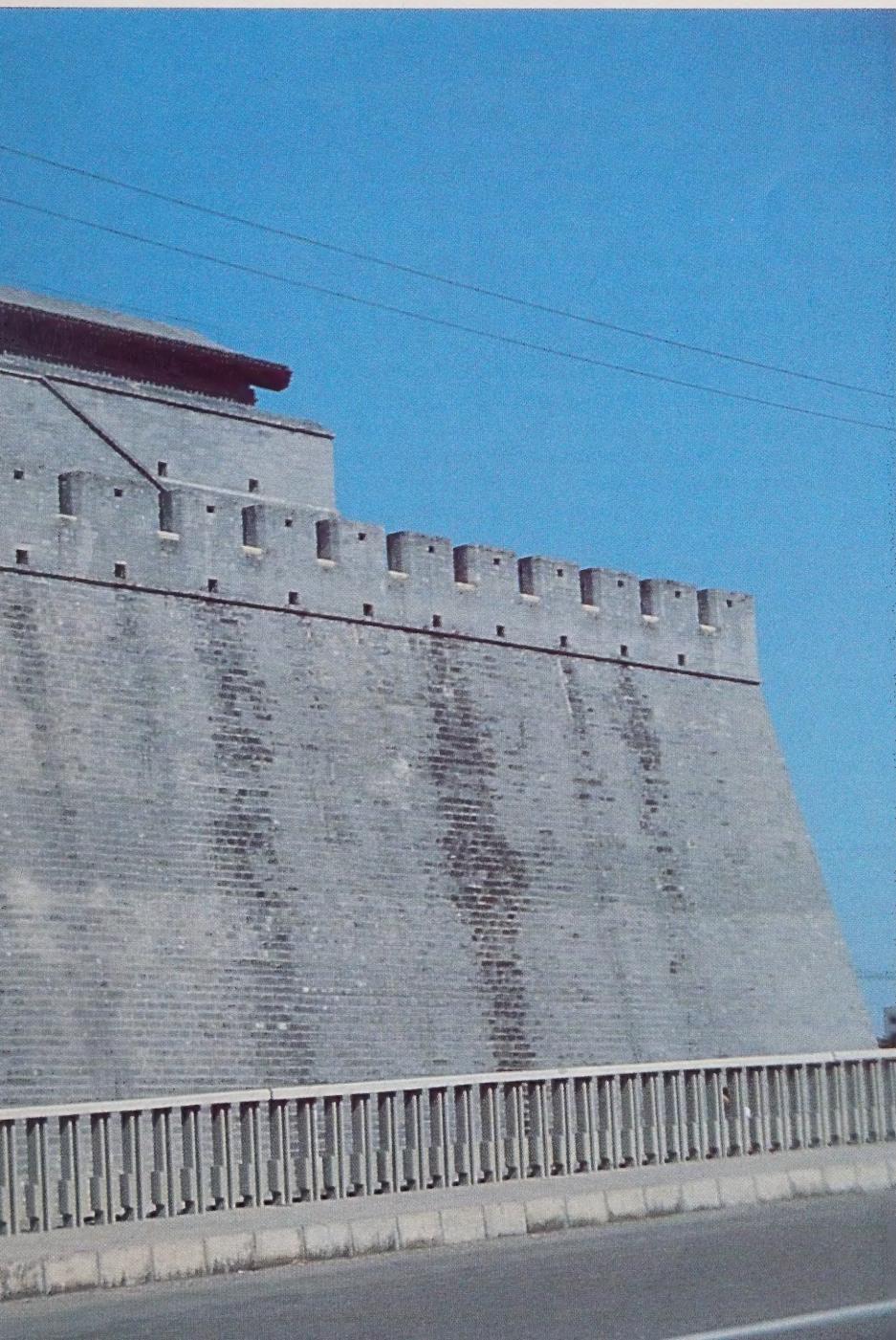
Watchers of the Eastern skies



IT seems likely that astronomy flourished in China during hundreds and even thousands of years B.C. Inscriptions on oracle bones dating back 3000 years to the time of the Shang Dynasty hint at observations of celestial events such as the appearance of new stars and total eclipses of the sun. However, since oracle bones were used for divination, the celestial references they contain are vague and it is almost impossible to establish from them the dates of actual observations.

Other clues and hints suggest that even earlier, perhaps as early as 2400 B.C., Chinese sky-watchers had already divided the sky into twenty-eight equal divisions called *hsiu*, or lunar mansions. These divisions radiated from the north pole like the segments of an orange, each containing an identifying star pattern or asterism. The north pole star itself held a position of particular importance in Chinese astronomy, being equated with the Emperor on Earth, around whom the state revolved, and from whom all power flowed. In the sky all stars revolve around the pole star, and the circumpolar stars—those that remain always above the northern horizon—were held to represent the Emperor's court and the country's lesser rulers.

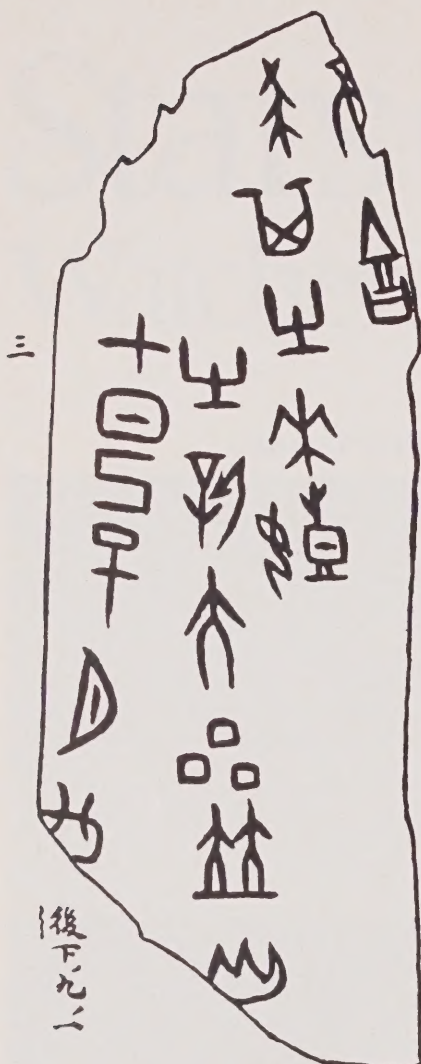
Paul Deans



Left: The ancient Beijing Observatory viewed from the east. This portion of the observatory, built in 1437, became part of the eastern wall of the city.

Below: Chinese sextant, made in 1673, could measure the angular distance between two celestial objects as long as that distance was less than sixty degrees.





Dating from about 1300 B.C., this oracle bone inscription is the oldest record of a nova. The two central columns of characters read: "On the 7th day of the month, a *chi-su* day, a great new star appeared in company with Antares."

With the exception of those otherwise credited, photographs on pages 6-11 are by the author.

However, we may never know for certain the exact state of Chinese astronomy before 213 B.C., because in that year a great burning of books was ordered for the purpose of erasing all memory of the period of "warring states" that had just ended. Many records that may have held astronomical references were destroyed in the process.

As if in compensation for the loss, the records extending from that period down to modern times are truly magnificent. In ancient China, astronomy became a political necessity as astrology grew in importance for the Emperor and his court. Consequently, observatories containing a variety of instruments (but no telescopes) were always attached to the Imperial palace, and the "Astronomical Bureau" was charged with observing, recording, and interpreting all celestial events. The records, summarized in dynastic histories, provide modern astronomers with an 1800-year-long listing of these events. Not until a telescope was first directed skywards in 1610 did European astronomers finally surpass their Chinese counterparts.

Since it was their responsibility to record everything that was observed to happen in the heavens, the Imperial sky-watchers noted the arrival and the movements of comets, the appearance of exploding stars, the passage of meteors and meteor showers, and the occurrence of eclipses (mostly solar) and sunspots. The body of data thus assembled provides modern astronomers with material for an assortment of studies.

When a giant star reaches the end of its life, it may self-destruct in a massive explosion. This is called a supernova. Thanks to large telescopes and modern photographic techniques, astronomers have observed these supernovae in other, distant galaxies; but no supernova has been observed in our own galaxy for nearly 400 years. Fortunately the Chinese astronomers recorded the appearance of seven particularly bright "guest stars" (supernovae) and of more than eighty fainter ones (novae). When radio telescopes are aimed towards the coordinates of these "guest stars", they reveal expanding clouds of gas, the wreckage of once-mighty suns. Because we know from Chinese sources the date of each explosion, these stellar remnants can be used to test various theories about supernovae. Until a supernova actually appears in our part of the galaxy, there will be no better method of investigating these exploding stars.

With a few notable exceptions, the observations of comets and meteors are not quite as scientifically useful. The problem with comets is that their positions are not recorded accurately enough to permit their orbits to be calculated. However, we do know that Comet Halley, now rushing towards its rendezvous with the sun in 1986, was seen in 240 B.C. and possibly as early as 1057 B.C. Several meteor showers now observed annually were recorded as early as 1500 years ago, thus providing an indication of how long particular meteor streams may last. And 700 years before Europeans observed the connection, the Chinese linked bright meteors or fireballs with stones that had apparently fallen from the sky.

Until the end of the 16th century, Western astronomers believed that the heavens were perfect and immutable. Events such as the appearance of comets or novae, therefore, were thought to be merely condensations in the upper atmosphere and not worthy of study. Comets, moreover, were regarded as portents of disaster and were not subjected to detailed astronomical scrutiny. The sun, on the other hand, shared the qualities of perfection and immutability accorded to the heavens in general. Any apparent blemishes on its supposedly perfect face were ascribed to birds or clouds.

The Chinese were not restricted in their studies by such beliefs. Though they did not understand sunspots, they faithfully recorded their appearance. When viewed through thick cloud or a sunset haze, sunspots as small as three times the diameter of Earth can be seen, but it was the larger groups that were usually noticed. Recent analysis by Chinese historians of ancient records of sunspots has led to the conclusion that the eleven-year sunspot cycle familiar to modern astronomers has been a regular phenomenon for most of the time during the last nineteen centuries.

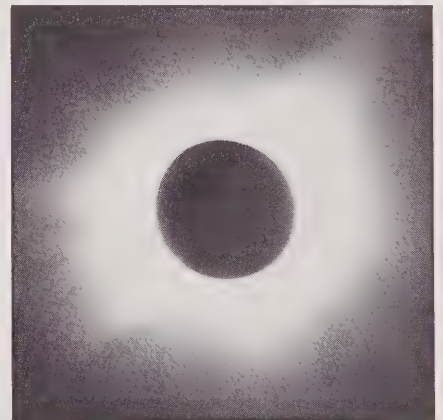
Eclipses of the sun and moon were naturally of interest to the Chinese. Shang

EAST—WEST TIME CHART

WESTERN CIVILIZATION—		—CHINA
	2300	
	2200	—First recorded observation of a total solar eclipse
Stonehenge completed in England—	2100	
Stellar risings used to tell time at night in Egypt—	2000	
	1900	
	1800	
Babylonians use sophisticated lunar calendar—	1700	—Early Shang oracle bones
	1600	
Systematic observations of Venus made in Babylon—	1500	
Egyptian temple aligned to winter solstice sunrise—	1400	—First recorded nova and lunar eclipse observations
	1300	
	1200	
	1100	
	1000	
	900	
Lunar eclipses predicted by Babylonians—	800	—Earliest recorded sunspot observations
	700	—Solar year set at 365.25 days
Thales (Greece) predicts a total solar eclipse—	600	—First recorded observation of a meteor shower
Pythagoras teaches that the Earth is round—	500	—Lifetime of Confucius
	400	—First catalogue of stars prepared; Earth believed to be a sphere.
Aristarchus suggests a sun-centred solar system—	300	
Eratosthenes calculates size of the Earth—	200	—First confirmed sighting of Comet Halley; Great Wall
Hipparchus discovers precession and makes first star map—	100	finished
	BC	—Silk Road in full operation
	0	—First known star map
Ptolemy completes <i>The Almagest</i> —	AD	—Invention of paper
(a work that influenced European astronomy	100	—First observation of a supernova
for more than 1000 years)	200	—Discovery of precession
	300	
	400	
“Dark Ages” underway in Europe—	500	
	600	—Invention of printing
	700	—Gunpowder invented
	800	
	900	
	1000	—Crab Nebula supernova observed
	1100	—Floating compass used for navigation
	1200	—Solar year set to 365.2425 days (only a 30-second error)
	1300	—Marco Polo travels to China
Printing appears in Europe—	1400	
Copernicus proposes a sun-centred cosmos—	1500	
Telescope invented and aimed skyward—	1600	—Jesuits arrive in China, bringing many Western
	1700	influences



Left: A circumpolar template made of jade, possibly used by astronomers to find the pole star. By aligning the notches along the edge of the template with certain northern stars, the star closest to the pole could be seen in the central opening.



Right: A total eclipse of the sun provoked feelings of fear and dread in primitive cultures, but today people travel thousands of kilometres in order to see one.

Sky-watching instruments arranged along the west and north walls of the ancient Beijing Observatory. The celestial globe (left), made in 1673, was used to measure the time of the rising and setting of celestial bodies. Larger versions were often driven by a water-clock so that the motion of the globe would match the motion of the sky; in this way, astronomers knew which stars were above the horizon even during daylight hours or when the night was cloudy. The quadrant (centre), also made in 1673, was used to measure the altitude above the horizon of celestial bodies; and the new armilla (right), made in 1744, was designed primarily to measure true solar time, though it could also be used to measure the celestial coordinates of objects seen in the night sky.

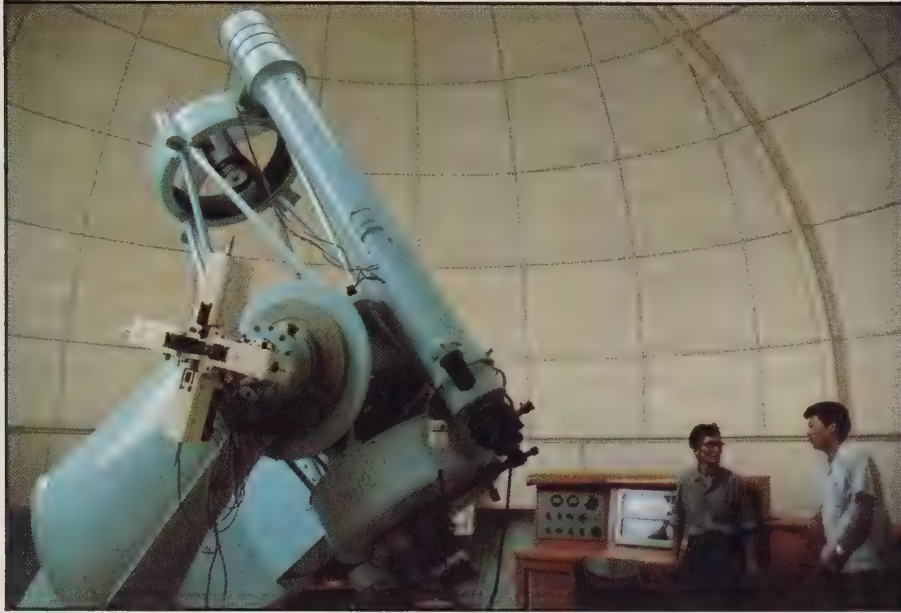
oracle bones, tentatively dated at 1217 B.C., depict an eclipse as a celestial dragon devouring the sun. However, even at this early date only solar eclipses evoked fear. Lunar eclipses were watched for calendrical reasons, because an eclipse of the moon can occur only during the full moon phase.

Old records of solar eclipses, especially those in which the date and location of the observation can be pinned down, are a valuable resource for planetary scientists. For example, the Astronomical Bureau noted that a total solar eclipse occurred during the afternoon of 4 March 180 B.C. and was visible at Xi'An, the Imperial capital of the Western Han Dynasty. But calculations of the eclipse track based on modern figures for the motion of the moon and the spin of the earth indicate that the path of totality should have passed nearly 9000 kilometres to the west of Xi'An. The discrepancy warns us that many things are not as constant as we like to think they are. Tidal friction between land and water acts to slow the rate of the earth's rotation, while changes in our planet's core tend to speed things up. The net result is a tiny but steady increase in the day's length which, when added to uncertainties in the moon's orbit, makes it difficult to calculate accurately old eclipse tracks. More records of ancient eclipses will help improve our knowledge of these variables.

It is sometimes thought that while ancient and medieval China was wonderfully advanced, Chinese culture has become stagnant during the past four centuries. In fact, China was simply overtaken by the rapid rise of European thought during the Renaissance. The invention of the telescope permitted Western astronomers to look at the heavens with new eyes. Although this instrument was introduced into China by the Jesuits in 1626, astronomy in China remained a political device for nearly 300 more years. Consequently, observing methods remained the same as they had been during the previous 1500 years, and the advantage provided by the telescope was ignored.

But the marvellous records from ancient China do have an important place in the modern world of orbiting telescopic eyes and giant radio ears. Astronomical information compiled by the Babylonians, Egyptians, Greeks, Romans, and me-





A 60-cm reflector of Chinese design inside the Shing Lo Observatory, one of China's modern stellar observatories. Professor Yin, the observatory director, is on the left; the guide/interpreter from the Beijing Planetarium is on the right.

dieval Europeans is fragmented, and the quality is erratic. Chinese sky-data, compiled during the same period, is generally superior in reliability and accuracy. Chinese observations also provide a fascinating insight into how two cultures can observe the same phenomena and draw different conclusions. For although the stars over China are the same as those over Europe, Chinese and European interpretations of the sky and the events therein are quite different. In our efforts to learn more about the cosmos, that different perspective has turned out to be extremely beneficial.



Dome housing a 90-cm Schmidt telescope, one of several instruments at the Shing Lo Observatory.

Paul Deans is a graduate of the University of Alberta in Edmonton. While attending university he worked part-time at the Queen Elizabeth Planetarium and became a full-time staff member in 1974. He joined the McLaughlin Planetarium as a producer in May 1980, and is now senior producer.

The Bishop White Gallery

Evelyn Nagai-Berthrong
Curatorial Coordinator
Associate Director's Office

In the Museum's renovation programme, the Bishop White gallery has been redesigned to give the effect of a Chinese Buddhist temple hall of the 14th century. The temple setting was chosen because it provided the best solution to the many design problems presented by the available space. Three large wall paintings installed in the 1930s had to remain in the gallery because of their size and their association with Bishop White, who was instrumental in their acquisition. The wall paintings were in need of conservation, and protection for display purposes necessitated barriers and a low light level. In addition, the centre of the gallery was dominated by a formidable pillar which interrupted views of the paintings.

Given these conditions, and the fact that other Far Eastern gallery space for Buddhist art is limited, the ideal solution seemed to be to combine the wall paintings and the ROM's extensive collection of roughly contemporary Buddhist wood sculptures into a more coherent unit that would be immediately understood as a temple environment, and at the same time be historically and theologically interesting. The setting presents the objects in a space which gives the feeling of the original temples, without falling into the pitfalls of reproducing a particular site.

The typical Buddhist shrine in China was built of wood on a central axis with entry gates leading to a main hall, a large, rectangular space with a raised central altar supporting sculpted images. The altar area was isolated by a wide walkway which provided space for ritual functions such as meditation, clockwise circumambulation, and the dedication of joss sticks. Interior walls were normally covered with impressive paintings which might be of either religious or secular significance. A few examples of this typical main hall still exist in China, but the best early wooden temples are, ironically, in Japan.

In the ROM's temple setting, the central area has a cluster of wood Buddha and bodhisattva sculptures. The figures, mostly larger than life-size, are raised on pedestals to elevate them from the mundane world. Dating between 1195 and the 14th century, the icons represent Guan yin (Avalokiteshvara), Wen shu (Manjushri), Da shi zi (Mahasthamaprapta), and others; all originate in northwest China, as do the wall paintings. The separation of the earliest and latest sculpture by approximately two centuries is not disturbing because it was traditional for donors to dedicate images throughout the life of a temple.



Part of the Bishop White gallery before renovation, showing the massive scale of the late 13th to early 14th century Daoist wall paintings.



One of the models used in designing the new Bishop White gallery. Design and model by Kuypers, Adamson, Norton.

Of the three wall paintings in the gallery, the north wall depicts the Buddha Maitreya, the Coming Buddha, seated in the Tushita Heaven awaiting his time to descend to earth. The flanking paintings have a Daoist theme of two processions of stellar deities converging towards the north. The combination of Buddhist and Daoist paintings was quite appropriate by the 13th century, when these paintings were produced. About 300 years earlier, Buddhism, having survived a checkered career in China, had been assimilated into the Chinese philosophical system. With time, the more salient features of Buddhism, Confucianism, and Daoism became less distinctly separate, an ideological syncretism reflected in the stylistic similarity of the three paintings.

The Maitreya scene came from the Hsing-hua ssu in Shansi. Although the exact provenance of the Daoist paintings is not known, comparison with wall paintings in the Yung-lo Gung in southern Shansi indicates that they may well have come from the same studio. Thus, all the paintings and sculpture in the temple setting were created in the same general area of southern Shansi Province.

The interior of a Buddhist temple is normally dimly lit by a few lamps. In the ROM temple setting, low light is required for conservation, a relative darkness that in fact lends a suitable air of meditative calm and mystery to the images. In imitation of extant portions of the Yung-lo Gung, long roof beams terminated by curving brackets and a coffered ceiling have been installed.

The Chinese temple setting presents the ROM's unusually large selection of wooden Buddhist figures and wall paintings in an atmosphere approximating their originally intended environment. The various and sometimes conflicting needs of technical preservation, protection, public access and information, and scholarly study have been accommodated in the best way possible. The temple setting is unique in its concept, design, and execution, and will be one of the highlights of the new ROM.

When the Bishop White gallery reopened, visitors who had been familiar with the old gallery were able to notice a remarkable change. Along with the rest of the Museum, the main artifacts of the gallery have undergone a complete renovation. The wall paintings have been cleaned and consolidated by a special conservation project set up in a nearby location. The sculptures were treated in the building by Conservation Department staff.

The design of the renovated gallery is described by Dr. Nagai-Berthrong in the accompanying article. Of the fourteen Buddhist sculptures involved, no more than seven have ever been on view at any one time and some have never been on display before.

All the sculptures are carved from wood, some from single large blocks with additions, others from a number of smaller blocks. On many of them detailed decorations have been applied in clay over the usual base layer of gesso. Paint or gold leaf has then been put on over the surface relief. Over the years incense smoke and general grime darkened the once-bright colours, and numerous coats of paint, gold leaf, gesso, and varnish were added in attempts to brighten them up again. As a result, the surface now visible is seldom the original one. On many of the sculptures, the present colours are the same as the original ones, but on others they may be totally different.

Restoring the Buddhist Statues

Marianne Webb
Decorative Arts Conservator
Conservation Department

GALLERY GLIMPSES



Variations in humidity and other environmental factors have caused the figures to deteriorate. Swelling or shrinking of the wood has caused much of the surface coating to lift and flake off, exposing the various layers of paint down to the wood. Numerous cracks are apparent in all the figures. Often the separate blocks or additions have become loose or detached because of the shrinking of the wood and the drying-out of the glues.

Various restorations involving repainting and the replacement of lost parts have been carried out in the past. It is difficult to tell exactly when these repairs were made. A few of the figures have been worked on at the ROM since their arrival in the 1920s, but most of the changes were made in China long before the sculptures were sent to Canada. The parts most commonly replaced were arms, hands, toes, and draperies. These are all exposed features that are easily broken off or damaged.

Sculpture arriving in the conservation laboratories usually exhibits most of the forms of damage described above, along with the accumulated grime from long periods of storage. All figures are put through the same basic procedure, although the actual treatment may vary according to the needs of the individual piece. The first step is to give the artifact a thorough examination and to note all damage. Diagrams are used for recording loss of paint and cracks in the wood, and photographs are taken to show the condition of every piece before any conservation work is begun.

Surface cleaning is the next step. The dirt is usually trapped in layers of wax, and so the two must be removed together by the use of a solvent. This process must be carried out very gently with cotton swabs, since the surface is very fragile; rough handling would cause loose paint flakes to become detached. Stubborn areas are cleaned by delicate scraping with a scalpel.

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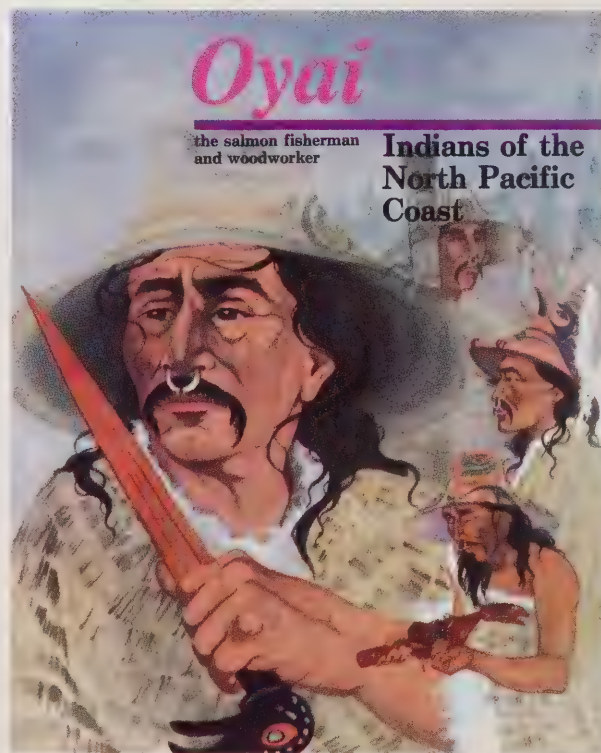
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Left: Marianne Webb at work cleaning one of the wood bodhisattva figures. Several completed statues can be seen in the background.

After cleaning, the loose and lifting paint must be consolidated. The method used will depend on the condition of the particular statue being treated. In very fragile areas the paint may have to be protected with a tissue facing while coats of consolidant are built up. Used in a solvent, a synthetic resin will penetrate the paint and reattach it firmly to the wood. In some cases the paint may have become detached from the wood, although the damage may not be visible on the surface. This blind cleavage can be detected by tapping the surface with a fingernail and listening for a hollow sound. It is repaired by injecting an adhesive under the paint layers with a hypodermic needle to reattach the paint to the surface beneath.

After the surface has been consolidated, structural damage is considered. First, loose parts are glued and/or dowed back into position. Certain missing parts must then be replaced either for aesthetic reasons or else to keep the whole structure from being weakened. On one figure, for example, five small blocks around the neck were missing; without them, the head sank down into the body. These parts had to be replaced to make the statue presentable and to keep it from deteriorating further. On another figure, one-third of the crown was missing; this was replaced for purely aesthetic reasons, because without it the sculpture seemed badly disfigured. But often missing parts are not replaced. Hands are commonly missing but are not reproduced because the exact positioning is not known. Missing toes are also seldom replaced, usually because their absence is not especially distracting.

Replacement parts are carved from a suitable wood to fit exactly the space of the missing original. Balsa wood is used on the edges of the fill to prevent any later expansion of the original wood from causing new stresses. The new piece is then attached by dowels and adhesive, or by screws. After sanding, the surface is coated with gesso to build up the fill to the level of the paint and to match the texture of the original.

The final stage is inpainting. The new fills, as well as some of the areas of paint loss, are painted with removable colours that closely match the surrounding paint. From a distance the touch-ups are indistinguishable from the adjacent areas, but on close examination the restored areas are apparent. The contrast is deliberate so that future scholars studying the piece will not be in doubt as to what is original and what is not. Some of the figures are then given a final overall protective coating.

Though the whole procedure is relatively easy to describe, it is nevertheless quite time-consuming. On the average, each figure has taken about two months to restore. Every step has been completely documented so that future conservators and curators will know exactly what changes have been made. The completed sculpture is now ready for display. The improved display conditions of the newly renovated gallery should help the statues to last for generations to come.

Opposite page: A bodhisattva before treatment. The head has been detached for cleaning; several other pieces are missing as well. Extensive surface dirt obscures the original brilliant colours.

Below: The same bodhisattva after treatment, now standing; cleaned, consolidated, and structurally sound.





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THE Museum's new discovery gallery provides an environment in which visitors have the opportunity to make closer contact with original museum objects and artifacts than is possible in the other galleries, and also to become familiar with the work and the collections of the ROM. It is the first gallery of its kind in Canada and is unique in the degree to which it represents all the Museum's collections.

The old discovery room, which was in operation for three and a half years prior to the Museum's closing for renovation and expansion, proved a great success with the public, young and old alike. The new discovery gallery will operate under the same basic philosophy, but there are some differences. It is very much larger than the former room and, in addition to the original content, contains material of a much broader scope and more challenging nature.

The components of the gallery are designed to be enjoyed by visitors of all ages, individually or in small groups. Of the original components, the most popular are the discovery boxes. These contain a variety of materials centred on such themes as sunlight, spice of life, Egyptian writing, coins, carpets, Islamic design, glowing rocks, and many others.



BILL ROBERTSON, ROM

Visitors have always brought material to the Museum for identification. The identification units in the discovery gallery enable them to answer some of their own questions. Here you can identify the butterfly that intrigued you in your garden or the fossil that you picked up during a nature walk. In various places in the gallery are strange and interesting objects—"stumpers"—to be picked up, examined, and wondered about. Visitors will also be delighted to find a forest area in the gallery. Here a discovery trail, an expansion of the tree corner in the old discovery room, simulates a woodland environment and invites you to walk among the trees and to discover the birds and mammals within.

Perhaps the most innovative feature of the new gallery is the work stations. They are the result of repeated requests from discovery room visitors for more sophisticated and challenging material. Each station is centred on a theme, ranging from the arts of man to bones and colour. The work stations are set up in study carrels that are, in effect, giant discovery boxes. The text that accompanies the material in the stations is longer and more detailed than that found with the other components of the gallery.

Support equipment, such as magnifying lenses, luxu-lamps, ultra-violet light, and microscopes, is provided in the gallery to assist in the study and detailed examination of objects. Texts and labels, many of them in French, accompany all the objects. A small reference library is also available.

The discovery gallery is a pleasant, informal environment in which self-directed learning is promoted with a minimum of supervision. The accessibility of museum objects for handling emphasizes and encourages the sense of touch as a means of learning. The gallery therefore serves as a mini-museum where visually impaired visitors can "see" with their hands. Text and labels in braille further help the blind visitor to explore the gallery. Twenty-eight squares of tactile material situated just outside the gallery introduce the visitor to the tactile experience and serve as a transition from the world of sight alone to a world where touch is an all-important element in the process of learning.

The Discovery Gallery

Frances MacArthur
Discovery Gallery Manager
Education Department

Because of the nature of the discovery gallery and the material in it, it has been found necessary to limit admission to visitors six years old and over. For children under the age of six, two large discovery baskets containing interesting and delightful material are placed just outside the gallery.

Beneath the Blue Lagoons

An ichthyological expedition to Fiji





THE Fiji Archipelago lies nearly 2000 nautical miles east of Australia's Great Barrier Reef and some 1000 nautical miles south of the equator. It consists of about 350 islands, of which the two largest are Viti Levu and Vanua Levu. Viti Levu is the larger of the two islands. Suva, the capital of the group, is situated at the southeast tip of Viti Levu, the larger of the two, and Nadi, the international airport, on the northwest coast, about 180 kilometres away by motorway road. The Archipelago was the locale of an ichthyological expedition in the spring of 1981 in which the author participated and which, as originally planned, was to have been made up of sixteen members from Britain, five from Canada, and one from the United States. In addition, television crews from the CBC and the ABC had been asked to accompany us for part of the trip. In the event, neither the locale nor the membership of the expedition was what had been originally planned.

Travel for the purpose of collecting specimens and recording scientific information is becoming increasingly difficult in today's world, particularly in the tropics, as local bureaucracies expand and multiply. We had initially planned to go to the Andaman Islands, an island group belonging to India in the Bay of Bengal, but the Indian government refused our application. Next, we tried for the northwestern tip of Sumatra, which was in the same geographic region but under different political jurisdiction. This proposal had to be abandoned when the Indonesians realised that they should retain all the specimens we collected and further demanded that we put these all our supplies in Indonesia.

Still undaunted, we then approached both Vanuatu and the Solomon Islands. By now our planning date was September 1981.

Richard Winterbottom
and Alan R. Emery

Beach in front of the field station of
the Institute of Marine Resources,
Dravuni.



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no choice but to take the chance that one of these two countries would welcome us. The early indications were favourable, and we therefore sent a thirty-six-cubic-metre freight container with supplies and equipment to the islands of Vanuatu in the South Pacific. When Vanuatu also had to be ruled out, we frantically sent orders by telegram to have our equipment rerouted to our last option: the port of Honiara in the Solomons.

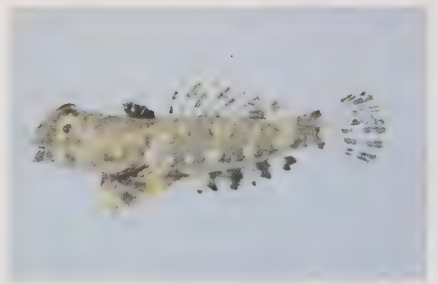
But our trials were not yet over. On the day that we were due to leave Toronto, we learned that one minister in the Solomon Islands cabinet had refused to give his approval for the expedition. Since the unanimous approval of the cabinet was required, the whole twenty-two-person expedition had to be called off. The British contingent was forced to cancel its participation outright, and the television crews, after some hesitation, also withdrew. After a great deal of soul-searching, the Canadian contingent decided to try to redirect the expedition, without notice, to Fiji rather than lose the thousands of dollars already committed. There were now six of us: two members of the Canadian Armed Forces, Master Warrant Officer Ralph ("Reb") McKinnon and Master Corporal John Payne; two technical assistants, Frances and Tim Emery; and two members of the ROM staff, Dr. Alan Emery and Dr. Rick Winterbottom.

We left Toronto on 25 February and flew to Fiji on CP Air's flight 311. On the final stages of the flight, we were presented with questionnaires that asked what type of visa we were using to enter Fiji. Here was a last hurdle. A visitor's visa expressly forbids the holder to engage in research. For any other type of visa, the prior permission of the Permanent Secretary for Immigration is necessary; but that official did not even know that we were coming. At 5 a.m. on the 27th, we presented ourselves to the customs officer at the airport at Nadi and handed him our applications for visitors' visas. He looked at us, glanced at the mountain of scientific equipment, and then stared disbelievingly at the visa applications. Obviously we were no mere visitors. Hastily we began to explain that we hoped to do work with the fisheries people, but he cut us short: "Fisheries? My brother works in Fisheries. You'll probably meet him there. Carry on through." We blessed our luck.

Our first week in Suva was spent in making contact with Fisheries and the Institute of Marine Resources (IMR) of the University of the South Pacific to gain their support in our application for permission to carry out research. We also managed to do some diving, though we could not collect fishes. Meanwhile Rick and Reb flew to the Solomons and were able to salvage essential chemicals from the container shipment sent there in December. The Fisheries officers there were greatly disappointed that our expedition had been cancelled, but they enthusiastically agreed to collect fish for the ROM, provided we paid the shipping costs. Some of the chemicals and equipment were unloaded from the container for their use. Rick and Reb then spent six days diving with the Fisheries officers, showing them how to use the chemicals, and how to collect, document, and preserve the specimens. For catching the specimens, a liquid mixture containing rotenone is used. This is squirted into the water around coral heads and caves and anaesthetizes the fish, making them easy to scoop up in hand nets.

In Fiji, meanwhile, the Fisheries department had made one of their research vessels available to us, and Alan and John were able to travel to the islands of Nairi and Gau, two small volcanic peaks with partially formed lagoons. Collections were made both in the shallow waters and also on the edge of the lagoon patch reefs (small patches of coral surrounded by sand), and on one occasion on the outer edge of the reef. These collections contained in abundance some specimens that were seen rarely—perhaps only once—during the rest of the trip. For example, several specimens of a priacanthid, a bright brick-red fish with a huge eye, were taken in wading depth at Nairi. Later on, Rick, who had not seen the specimens from Nairi, spent many frustrating minutes in water over thirty metres deep stalking the only other specimen seen on the expedition.

The dive outside the reef produced one of the most unusual experiences of the expedition. The collecting operation on the bottom was carried out in water that was crystal-clear but very cold. By the time Alan and John began their re-



Top: A priacanthid ("big-eye").

Centre: A new species of angelfish (genus *Centropyge*).

Bottom: An undescribed species of mandarin fish (genus *Synchiropus*).

Photographs on pages 18-27 are by the authors.

Following tradition, a drink of ground kava roots and water was prepared once the Dravuni village council had given its assent to the plans of the ROM expedition.



turn to the surface, the tide had turned and the water was tumbling from inside the lagoon out over the edge of the reef. As they rose to the surface, they could see above them a dark layer like a ceiling, so sharply defined that it was possible to stick a finger into it. This was the interface between two bodies of water, the upper one of which was three or four metres in depth and so full of a fine sediment that the surface was invisible from below. It was also, as Alan and John discovered when they tried to swim in it, uncomfortably hot. What they had encountered was geothermically heated water from the outfall of a hot spring. However, they had no choice but to swim up through it and clamber up into the shallow water on the reef top in order to reach the boat—all of which they did with a speed that suggested sharks in hot pursuit.

When the team reassembled in Suva, we had made preparations for it to spend three weeks at the IMR field station on the island of Dravuni, which lies sixty-five kilometres south of Suva surrounded by the Great Astrolabe Reef. For this part of the expedition we had the use of the twenty-metre tuna boat *Aphareus*. Before we could begin work on the island, however, there were certain formalities to be observed. Fijians are extremely hospitable people, but because the forests and reefs are essential for their survival, they like to know what your intentions are before they allow you to wander about collecting things. Accordingly, we were invited to a meeting with the chief and his advisers, at which the captain of the *Aphareus* explained who we were and what we wanted to do. Following tradition, we had brought with us a bundle of roots of the kava shrub, a member of the pepper family. When the village council had finished its discussion, the chief signalled his assent to our plans by having one of his assistants accept the roots. These were then taken away, ground to powder with a pestle and mortar, and mixed with water in an enormous bowl called a *tanoa*. The drink was then offered by a server in half coconut-shells, first to the chief, then to the advisers and guests. The recipient had to drain the shell immediately and then spin it on the ground in front of the server, saying "Methe" ("It is empty"), while the rest of the company clapped their hands with a soft, deep sound.

Having been accepted by the villagers, we were ready to begin work. We started our diving at depths of about ten metres, gradually working our way down to about thirty metres as we grew fitter and more acclimatized to the conditions. We did not try anything deeper, because we could have stayed only a limited time at those depths without decompressing and it was too risky to attempt decompression dives in such a remote area.

One area we hoped to sample was the windward side of the outer reef, but the task was made difficult by the two- to four-metre waves which, driven by the constant tradewinds, crashed thunderously down on the jagged crests of the reefs. Our small inflatable boat with its unreliable motor was no match for these conditions, but we received unexpected help from Hurricane Sarah, which passed 160 kilometres to the north of us and so disrupted local weather conditions that the wind direction was temporarily reversed and the windward side of the island became the lee. For three days we were able to slip across the top of the reef at high tide in comparative safety.

The diving outside the reef was spectacular. We swam among great rolling hills of coral divided by narrow, steep-sided meandering valleys with floors of white coral sand. Overhead hung constant clouds of fish busily picking plankton from the water or darting to the shelter of the coral when a predator approached too closely, while here and there pairs of fishes spiralled upwards with explosive energy in a spawning dance. Great groupers watched the kaleidoscopic scene imperiously from the mouths of caves, their jaws moving slightly as they breathed.

It was here that Reb and John saw their first sharks—an encounter they had not been particularly looking forward to. Four grey reef sharks swept in one morning as we were preparing to set down the chemicals. We moved closer to one another and then froze against the coral wall as the sharks swept to and fro, sometimes no more than three metres away. Although the sharks were quite small—about two metres long—they were quite large enough to have done a



Yellow sponges, orange corals, and two golden sea bass (*Anthias squamipinnis*) on the roof of a cave. Because the fish orient to the roof of the cave, the picture appears to be upside down.

great deal of damage, had they attacked. What they provided, however, apart from the excitement, was a graphic demonstration of how graceful and awe-inspiring these creatures are as they patrol their natural domain.

Dravuni is typical of many of the island villages in Fiji. The people live on a bland and somewhat monotonous diet of cassava, taro, and fish, with some fruit. There are two principal methods of fishing: angling with hand lines and spearfishing. In some villages near the larger islands, gill nets and traps are also used. In addition, the young boys spear fish with hand slings—just a loop of rubber and a piece of sharpened reinforcing steel picked up on some construction site. The boys are remarkably accurate marksmen.

Dravuni's fishing cooperative owns a ten-metre diesel launch, two small punts, and one outrigger canoe (these last are very scarce in Fiji today). The men of Dravuni are very competent spearfishermen; they work with mask and snorkel, but usually without fins, and shoot the fish with a large, single-stranded spear gun. During our stay they shot fish up to about eighteen kilograms in weight, but most were about one to one and a half kilograms. On most days the catch for the whole group was thirty-five to forty-five kilograms—less than one kilogram per man per hour. Handlining is done almost entirely at night by the women. Their catches are even smaller, averaging about half a kilogram per woman per hour. From an economic point of view the figures are dismal. Each man would retain from a half to two-thirds of his catch for food. The remainder, which he sold, represented less than half a kilogram for each hour's work. Since the village paid about \$0.66 per kilogram for the fish, his monetary return for an hour's fishing was about \$0.30 per hour.

When the time came for us to leave Dravuni, our friends in the village gave us a farewell party prepared by the women at the community centre. First there was traditional dancing, in which a row of dancers performed graceful swaying movements to the haunting melodies of the South Pacific. Next came a demonstration of how tapa cloth is made. The inner bark of the tree is beaten out on a smooth wooden block into a sheet approximately sixty centimetres square, which is allowed to dry in the sun for a day. The pattern, usually a geometric one, is then stencilled on with red and black pigments. The meal consisted of an astounding array of cakes, cookies, doughnuts, and other confections, all produced without benefit of ovens and accompanied by vast quantities of tea. Finally the men took over in a bid to ensure that we would never forget what a

High tea, Dravuni.



Soft corals and, in the bottom right corner, a damselfish; Dravuni.



Author Richard Winterbottom inspecting and documenting the line-fishing catch at Dravuni.



true kava session among friends was like. The dancing and kava-drinking continued until 4 a.m., just two hours before the *Aphareus* was due to take us back to Suva. It was a sorry crew that sailed that rainy dawn.

In the Suva area, collecting continued both among the reefs and lagoons and in the mangrove swamps. These latter are used as nursery areas by the young of many commercial species of fishes. It was a brilliant, hot day when we first set out to sample the mangrove swamps. As we approached the dark green wall of vegetation, we saw ahead of us a tiny opening barely wide enough for the boat. Inside the air was hot and dry, and we slid in almost complete silence between vertical green walls made up of the dense mass of the mangroves' branches and aerial roots. The only sounds to be heard were the occasional call of a bird or an insect, the gentle murmur of the flooding tide, and the soft crackling of the shrimps underwater. Surprisingly there were few mosquitoes, and fortunately the saltwater crocodile has not been sighted in Fiji for decades. Among our catch from this trip were bizarre blind fish, fish that spend most of their time sitting out of the water on the mud, and small fish that climb nimbly over the lowest branches of the trees.

On 22 April Rick returned to Canada. By this time our collection had grown to nearly 700 kilograms, and yet we were still finding many species that we had not collected before. The rest of the team headed northwest to the Yasawa Islands.

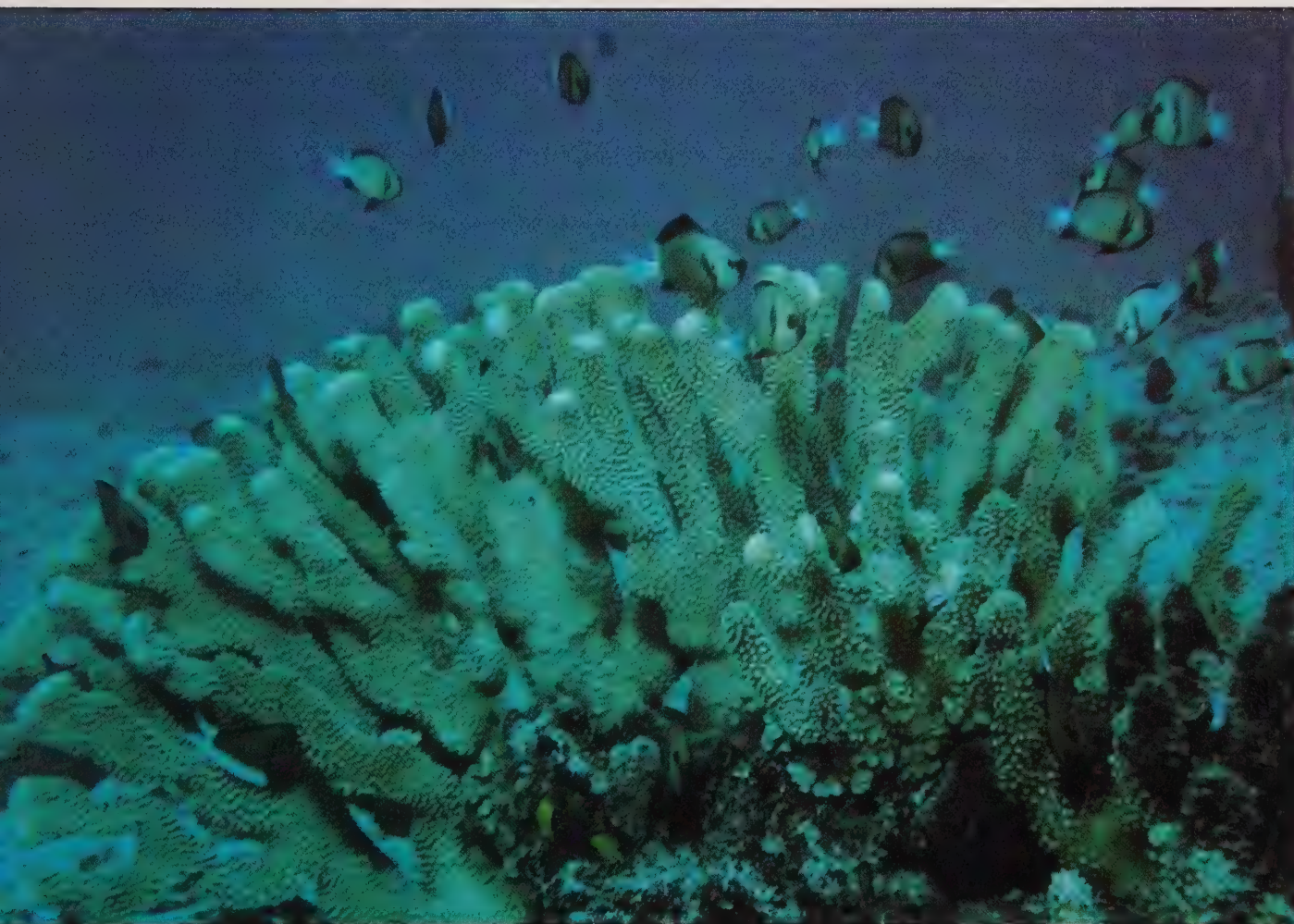
The Yasawas present the image of Fiji that is most familiar of all to Western eyes: the tropical paradise of white sand, blue sea, and green palms where the movie *Blue Lagoon* was filmed. On our first morning in our new location we set off for a tiny rocky islet nearby, where, according to a strange local legend, all the fish were poisonous to eat because of the unusual clarity of the water. Tim, who was a dead shot with a sling spear, was to collect specimens in the fifty-metre stretch between the inflatable boat and the islet. Alan instructed him to

stay within this area because the water elsewhere looked dangerous. Alan himself chose a likely spot underwater to set out the chemicals which had been carefully prepared earlier that morning. Usually the chemicals begin to immobilize the fish within minutes, but on this occasion, to everyone's dismay, there was no reaction, and Alan called off the dive early. The divers rose to the surface almost empty-handed and clambered aboard the inflatable.

Tim was nowhere to be seen, but the *Aphareus* had moved close to our anchorage. Something must be wrong. Everyone looked anxiously for Tim until a shout and a wave from the crew of the *Aphareus* reassured us that he was safe aboard with them. Later we learned that very soon after Tim had entered the water a large shark had appeared and rushed at him; it swerved and moved out of view, only to come back again shaking its head from side to side. This behaviour on the part of a shark is a threat, and indicates danger. Tim swam for the rocks at record-breaking speed and flung himself up onto the shore, without stopping to look back. The crew of the *Aphareus* had seen him clamber out, realized that he was waiting to be rescued, and launched the second inflatable. When they reached the rock, Tim refused to swim to the boat but waited until it was manoeuvred near enough for him to jump. He had had a close call and had suffered cuts on his legs and his side from the sharp calcareous growths on the rocks as he scrambled ashore; but no permanent damage had been done.

One investigation for which we are always seeking evidence during our collecting expeditions is the history of the great tectonic plates, those large pieces of the earth's surface that fit together like a spherical jigsaw puzzle. For this inquiry Fiji turned out to be of exceptional interest. An article published while we were in Suva presented evidence to support the view that Fiji, or at least parts of it, is of continental rather than volcanic origin. One's first intuitive guess would be that continental Fiji must have been part of the Australasian/New Guinea

Damselfish (*Dascyllus*) hovering above hard coral (*Acropora*).



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A bure (thatch house) at Yabawa.

plate, simply because that is the nearest continental land mass. But that may not be so. There has been considerable sea-floor spreading between the two, showing that there has been a very long lapse of time since continental Fiji—if such it is—was in contact with other continental land masses. The island groups of New Caledonia, Vanuatu, and the Solomons, all of which are high volcanic islands, lie between Fiji and the Australasian/New Guinea plate and so must have been formed after Fiji's separation from its parent plate. By studying the affinities of Fiji's fish fauna with those of the continental plates, we hope to be able to tell whether Fiji drifted down from the north from the region of the Philippines or is of Australasian origin, or whether there is some other explanation for its existence.

Richard Winterbottom received his undergraduate training at the University of Cape Town, South Africa, and completed his Ph.D. at Queen's University, Kingston, Ontario in 1971. Postdoctoral fellowships at the Smithsonian Institution and the National Museum of Natural Sciences, Ottawa, followed, and, back in South Africa, he taught ichthyology at Rhodes University and curated the fish collections of the J.L.B. Smith Institute of Ichthyology for several years. He joined the ROM's Department of Ichthyology and Herpetology in 1978. In 1979 he took part in the British Armed Forces Chagos Expedition, and in 1981 collected fishes for the ROM in Australia, the Cook Islands, and Fiji. Dr. Winterbottom's current research activities include the systematics and zoogeography of Indo-West Pacific Fishes, and the genealogy of the families of perchlike fishes.

Alan Emery's interest in fishes developed early, and following completion of his B.Sc., he worked at the Bellairs Institute (Barbados) of McGill University, where he received his M.Sc. After spending a year with the Fisheries Research Board of Canada at St. Andrews, New Brunswick, he studied at Cornell University and the University of Miami's Institute of Marine Sciences for his Ph.D., which was completed in 1968. For the following five years he worked as a research scientist with the Ministry of Natural Resources in Ontario.

Dr. Emery joined the ROM's Department of Ichthyology and Herpetology in 1973. His research interests are broad-ranging and include the study of fish evolution and relationships, ecology, and reproductive and sound communication behaviour. These studies have taken him from the equator to the high Arctic. In July 1983 he was appointed director of the National Museum of Natural Sciences.



An Icon of the Divine Liturgy

THE Royal Ontario Museum contains the largest collection of icons of any public institution in Canada. The collection consists of thirty-three icons donated by Dr. Janetos in 1978, together with thirty-two others, all of them dating from the 16th to the 20th century.

One particular item in the collection, a Greek icon of the Divine Liturgy (i.e., the Holy Mass), probably painted at the end of the 17th century, is of particular interest; it not only helps to demonstrate the distinctiveness imparted by the Christian religion to Byzantine art, but also illustrates the form and limitations imposed by the Church on Byzantine art in all its manifestations.

The techniques of the icon's construction are Greek. The panel consists of a single piece of cedar 61 cm long, 51 cm wide, and 2.5 cm thick. Two cedar struts are nailed horizontally to the back in a not entirely successful attempt to prevent warping and cracking. The painting is in tempera on a gesso ground; the back of the panel is also covered with gesso.

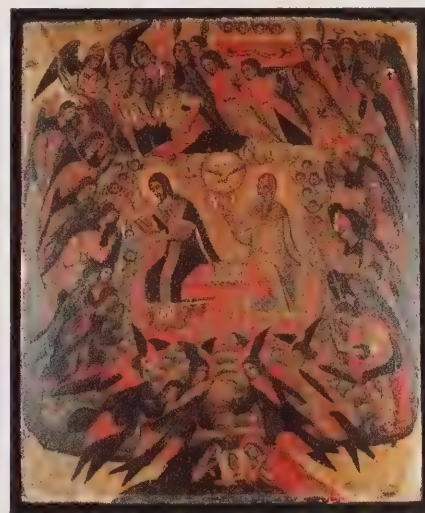
The figures at the centre of the panel represent the Holy Trinity. God the Father, in white, gives the sign of the blessing with his right hand; God the Son, in the red robe of a celebrant, receives the offering from an angel; the Holy Spirit appears as a dove. Surrounding the Trinity are thirty-two angels carrying the holy elements and implements of the Mass. Three angels at the top carry the *epitaphios*, a cloth with a depiction of Christ in the tomb used during Holy Week. Above them, and also on both sides of the Trinity, flutter Italianate bodiless cherubs. At the foot of the altar a man and a woman prostrate themselves before the scene.

The Greek texts inscribed on the icon specify the theological significance of the scene. Above the *epitaphios* is written "The Divine Liturgy". On the left is the text of the hymn sung during the procession of the Gifts on Holy Saturday:

Let all mankind be silent
and let us stand with fear and trembling
and let us not think of anything worldly,
for the King of kings and Lord of lords
comes to be slain and to be offered as food for the faithful.
Before him go the legions of angels with all authority and power,
the many-eyed cherubim and the six-winged seraphim,
with covered faces, singing Alleluia.

The text above the kneeling couple is the well-known formula of the Mass "Holy, holy, holy, Lord God of Sabaoth . . ." An open book on the altar carries the benediction used at the beginning of the Mass. On the right side of the panel two helmeted angels hold texts from the night office of Easter Day: a hymn to

Ladislav Cselenyi
and Neil Moran



The icon before conservation.

Opposite page: The icon of the Divine Liturgy after conservation. 50.8 × 61 cm

Examination of the panel, prior to conservation treatment, showed it to be generally in excellent structural condition. The main conservation task was to clean it. Many layers of linseed oil varnish applied to the surface had darkened with time, obscuring much detail and the brilliance of the colour and the gold. Several solvents were tested before a suitable one was found. Combined with sawdust to make a poultice and applied to the painting's surface for about a minute, it caused the varnish to soften to a gel, which was then removed with a weaker and fast-evaporating solvent applied with a cotton swab stick. Particularly obstinate areas received further treatment with the solvents. The dramatic results of the cleaning process are shown in the accompanying illustration, showing the icon with one half treated and the other half still untreated.



the Virgin, "Mind, the unborn Father", and an ode of the daily Hours, "One three-substantial Authority". An angel in the upper row carries a text dedicated to the Trinity from the post-Easter period, "Trinity without Beginning".

There are a few other short inscriptions. In red letters above the upper row of



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angels is the abbreviation for "ancient dynamics", a term of great importance in Orthodox theology. On the *epitaphios* itself are the words "the *epitaphios* hymn". And in the lower right-hand corner is the signature of the artist, "hand of John".

The portion of the Divine Liturgy that forms the subject of the icon is the procession of the Holy Gifts that takes place after the initial scriptural readings and the closing of the church to all but the faithful. The angels represent the deacons bearing to the altar bread, wine, candelabra, censers, fans, crosses, the *epitaphios*, and the liturgical books. The text "Let all mankind be silent" indicates that the scene represented is the procession of the Great Entrance on Holy Saturday, since this is the only occasion in the year when this hymn is sung. On this day the *epitaphios*, symbolizing Christ's burial, is carried about the church "for before the King of kings and Lord of lords go the legions of angels with all authority and power". The expectation and anticipation of joy on the eve of the Resurrection is expressed by the vivid coloration and movement while, at the same time the congregation, represented by the two figures before the altar, "is silent with fear and trembling, oblivious to all worldly care". Artistic licence permits the omission of the many eyes of the cherubim and the covered faces of the seraphim.

The basic idea expressed in the painting is not original; it follows a plan for depicting the Holy Liturgy that has been in use from the 14th century. Processions of angels moving towards a central altar are found in Serbian fresco cycles at Studenica, Chilandar, Gracanica, and Péc. By way of monasteries on Mount Athos, this same manner of representation was transmitted to Georgia, Bulgaria, Romania, and Russia. What is new, however, is the depiction of the Trinity and the *epitaphios* within such a scene on a panel painting.

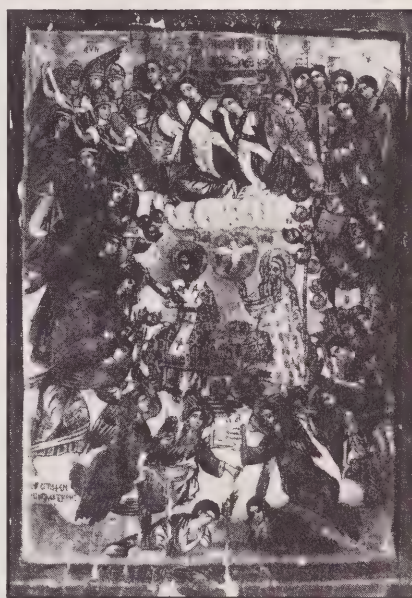
The clue to this new feature of liturgical icons can be found in the iconography and style of the work of Michael Damaskenos, the most important of the late 16th-century Cretan painters. Damaskenos was born in Candia (Heraklion) about 1550; in 1574 he went to Venice where he was commissioned to paint the whole iconostasis of San Giorgio. Twenty-three of the icons in this church are ascribed to him. In Venice he was influenced by many Italian masters, but after his return to Crete in 1584 he reverted to his earlier, wholly Byzantine style which was typical of the Cretan painters of the period. The Cretan school has been called "the last phase of Byzantine painting".

One of the icons painted by Damaskenos has the Divine Liturgy as its subject and may be considered as the model for the ROM's icon. Now in S. Minas in Heraklion, it is dated by Alexandre Embricos between 1579 and 1584 and is considered one of the late Byzantine works influenced by the West. For example, the *putti*, or cherubs, dotting the sky are one among many Italian motifs. The clothes on the figures are loose and undulating, and may indicate a Macedonian tradition. But in spite of all this, the artist maintains the sacred character of the ceremony which unfolds in the Orthodox rhythm.

Damaskenos' icon of the Divine Liturgy, though it derives from images created during the period of the Palaeologi (the last Byzantine emperors), differs from those images. In particular, the inclusion of the Trinity and the *epitaphios* in one picture, with the procession surrounding the Trinity, modifies the structure of the traditional theme completely. This may indicate that the arrangement of the Damaskenos panel is the artist's own invention, inspired by Titian's *Triumph of the Trinity* (1551-54), now in Museo del Prado in Madrid. The innovation, however, did not eclipse the Greek tradition, which is maintained in the figures of the Father and the Son, and in the angels carrying candlesticks, thuribles, and the other accessories of the theme.

That Damaskenos' icon of the Divine Liturgy is unusual in composition with regard to both the Trinity and the *epitaphios* can be seen also from the *Painter's Manual of Dionysius of Fourna*. Dionysius' description of how artists of the period represented the theme of the Divine Liturgy bears only a partial resemblance to Damaskenos' composition.

Michael Damaskenos' icon of the Divine Liturgy appears to have inspired a number of imaginative copies, including the icon signed "John" in the ROM's



Above: Michael Damaskenos' icon of the Divine Liturgy, late 16th century.

Below: 17th-century icon of the Divine Liturgy painted by Nicholas the Cretan.

A Mystery for the Eye



Two photographs were discovered in a discarded box outside a photo lab in Toronto. Although several attempts have been made, in the end no one's been able to find the original photographer nor locate the negatives from which the photos were printed.

Subsequently it's become impossible to determine which of the two versions is the right way round. People seem to feel they can tell though, and if you look at this page you will probably have the same instinctive sense of knowing. So we asked ourselves why.

Perhaps, we thought, it was due to some cultural phenomenon, like reading from left to right, which over the years would develop a way of looking at things. A little pleased with our theory we realized it would hold water if everyone had chosen the same picture. But of course, in keeping with the strangeness of the whole affair, they hadn't.

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collection. In 1905 the Sacred Academy of Kiev had a similar icon in its collection, painted in the 17th century by Nicholas the Cretan and acquired from Mount Athos. A description of the picture is followed by the comment: "Similar compositions, but more strict in the iconography, are in the dome of the cathedral in Chilandar . . ., in the monastery of St. Afanasij on both sides of the altar, as well as in the Nicholskij part of the same church, in the eastern deepening of the altar in Kutlumusi, also in the chapel of the Mother of God in Iver . . ." Thus the inspiration of the new type of liturgical icon gradually spread in Russia and secured monuments such as murals and paintings in many churches.

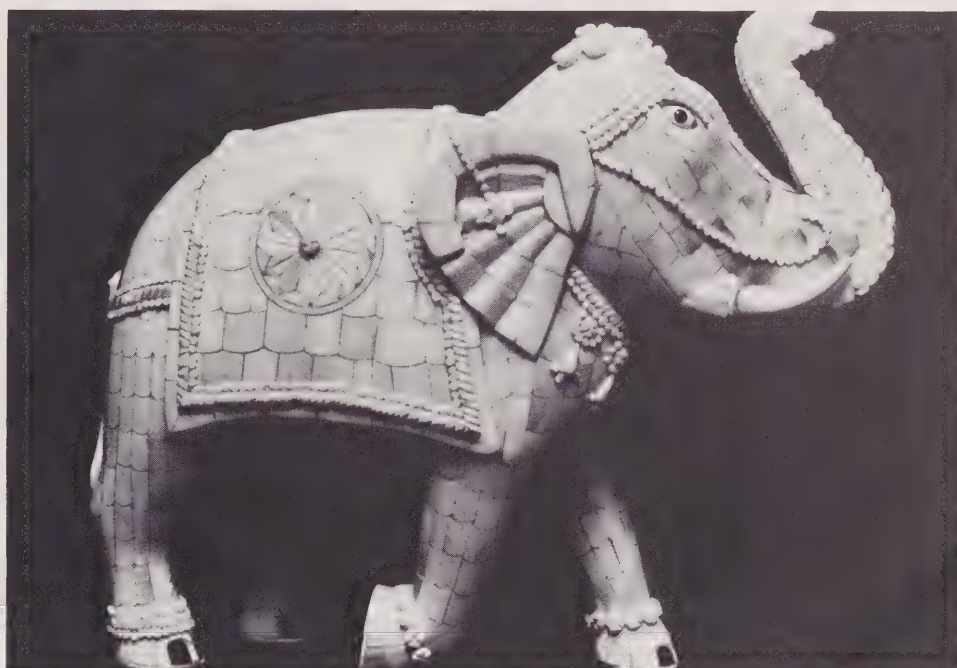
Nicholas the Cretan, painter of the Kiev panel, was probably well acquainted with Damaskenos' original. But when his icon and the ROM's are compared with Damaskenos', it seems obvious that neither of them is a direct copy; the comparison suggests, rather, that the two later panels were done from sketches with notes of the colouring.

The question of the authorship of the icon in the ROM collection can be resolved by comparing it with an almost identical icon in the collection of the Greek Institute in Venice, signed by John Moskos. John Moskos' exact dates are uncertain but he is known to have been active between 1680 and 1714. The manner in which Moskos imitates the icon by Michael Damaskenos suggests that the ROM panel should be dated to the end of the 17th century. Further research will have to determine whether the ROM panel is the original by John Moskos or a copy.

Ladislav Cselenyi, a former director of the Slovak National Museum, joined the staff of the ROM in 1968 and currently is associate curator in charge of the European Department. He has earned degrees in music pedagogy and art history from the University of J. A. Komensky, Bratislava, and from the University of Toronto. In addition to his curatorial work he has written historical novels and has composed short forms of music.

Dr. Neil K. Moran studied music, art, and history in Edmonton, Boston, and Hamburg. In 1977-78 he was a fellow at Harvard's Center for Byzantine Studies in Washington, D.C. He is the author of studies on the relationship of art and music in the Eastern Orthodox tradition. At present he is a research associate at the Pontifical Institute of Medieval Studies in Toronto.

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L'art de l'architecte

Three centuries of architectural drawing in Quebec City

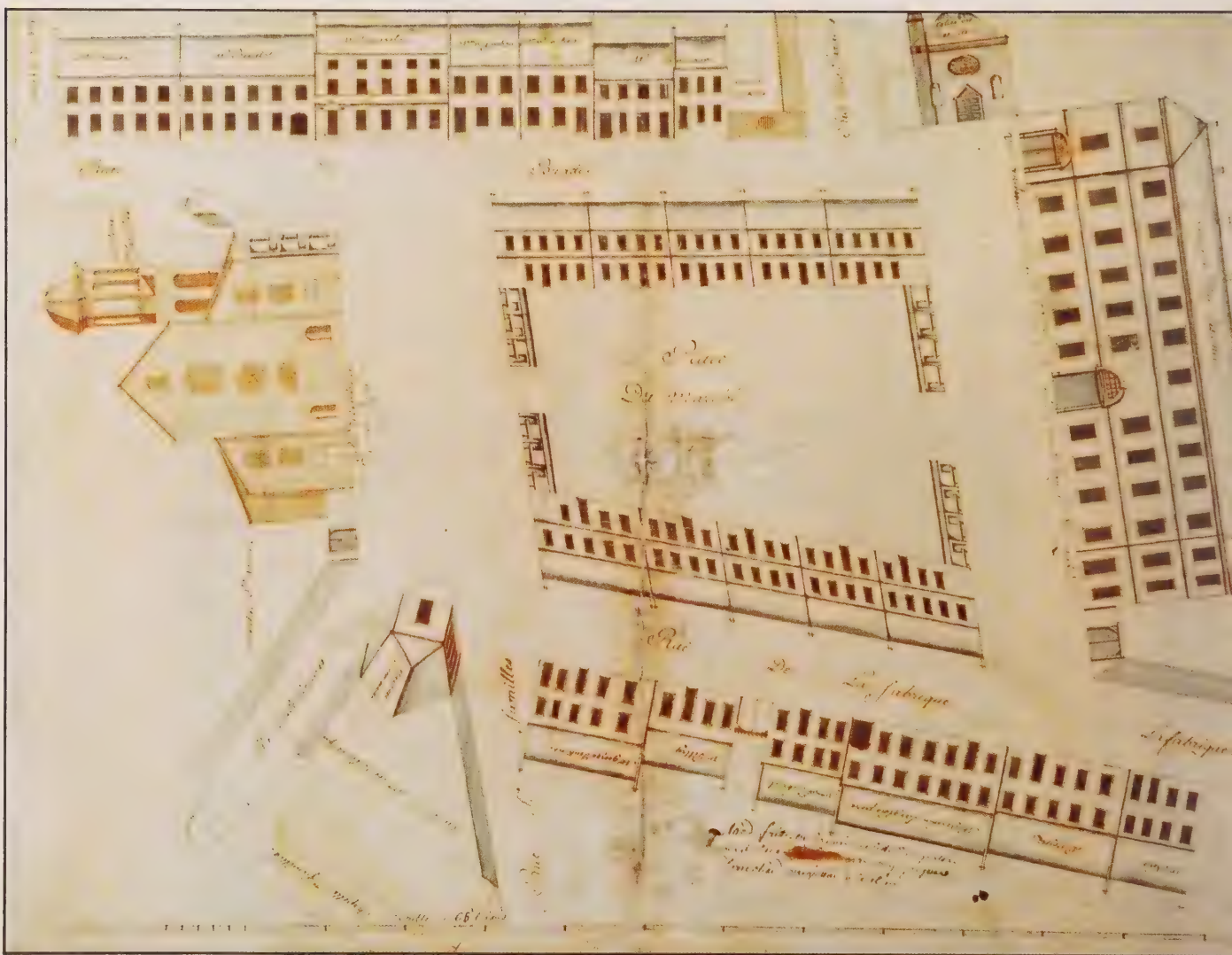


Fig. 1. Plan for Notre-Dame market square, 1782, by Jacques Dénéchaud (1728–1810). This drawing shows a market in the centre surrounded by two rows of houses and butchers' stalls. The structures are opened up and laid flat, which makes it possible to represent the plan in its entirety in a manner somewhat similar to the use of scale models or raised relief models. (Archives of Notre-Dame parish, Quebec City)

THE best way to study architecture is to take a walk down the street and observe the distinctive qualities of the buildings as you pass, buildings which go together to make up the environment constructed around you. No exhibition, however interesting, could take the place of a tour of London, Paris, Rome, Toronto, or Quebec City. So why have we set up an exhibition about architecture in a museum? Why should you visit this exhibition "L'art de l'architecte: Three centuries of architectural drawing in Quebec City" at the Royal Ontario Museum?

Luc Noppen

For a number of years, museums all over the world have held architectural exhibitions. Since most museums have not collected buildings, architecture is represented in their collections by fragments of buildings and by documents. Among the latter, photographs and drawings are particularly important because illustrations are the means used in such collections to depict structures considered to be of interest. The architecture of Quebec City in 1830 could very well have been shown by means of an exhibit of Cockburn's watercolours, and its architecture in 1875 with an exhibit of a selection of old photographs. However, as the title "L'art de l'architecte" indicates, the focus of this exhibition is not on buildings but on architectural drawings.

Architecture is defined in a general way as "the art of constructing buildings". However, the finished building is the result of a process in which creation and execution are combined; before being constructed with materials by men or machines, the building was a concept. It is in the conception, much more than in the subsequent execution, that creation takes place.

Thus the study of the history of architecture calls upon the plan of the creator—the architect—to understand better and to explain a building, and to locate its construction at the end of an architectural conception, in between which a multitude of factors play a part—the production schedule, the social and physical environment, the influences of other architects, and so on. Seen in this way, architecture is a body of practices of which the result or the aim is finished buildings. And one of these architectural practices is drawing, which expresses in graphic form the plan or intentions of the architect.

The exhibition "L'art de l'architecte: Three centuries of architectural drawing in Quebec City" presents about one hundred works chosen for the purpose of outlining the evolutionary thrust of the practice of architecture in Quebec City from 1679 to 1912. Architectural drawing can be examined from several angles. The plans on display are valuable first of all as documents: they are a record of buildings that exist or that once existed. For example, the drawing of the Dalhousie gate of the citadel in Quebec City allows the ROM visitor to become acquainted with this characteristic feature of the architectural environment of Old Quebec City. This design is of documentary value just as is a photograph, old or recent.

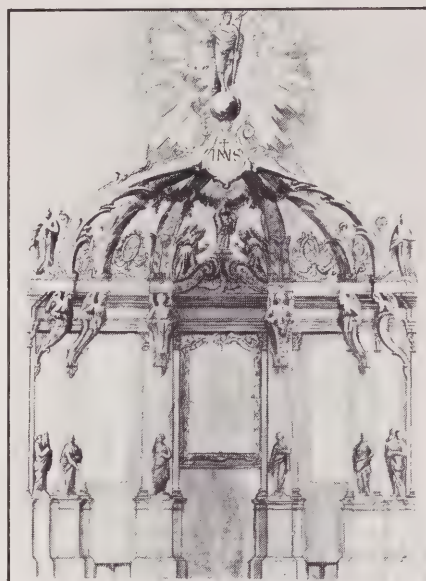
At the same time, an architectural drawing may be interpreted in terms of architectural history, with respect to the distinctive qualities of the building that it portrays. The façade that was drawn by Royal Engineer Gaspard Chaussegros de Léry in 1744 for the cathedral of Quebec City (fig. 2) no longer exists. This document is therefore unique and makes it possible to identify the style of this



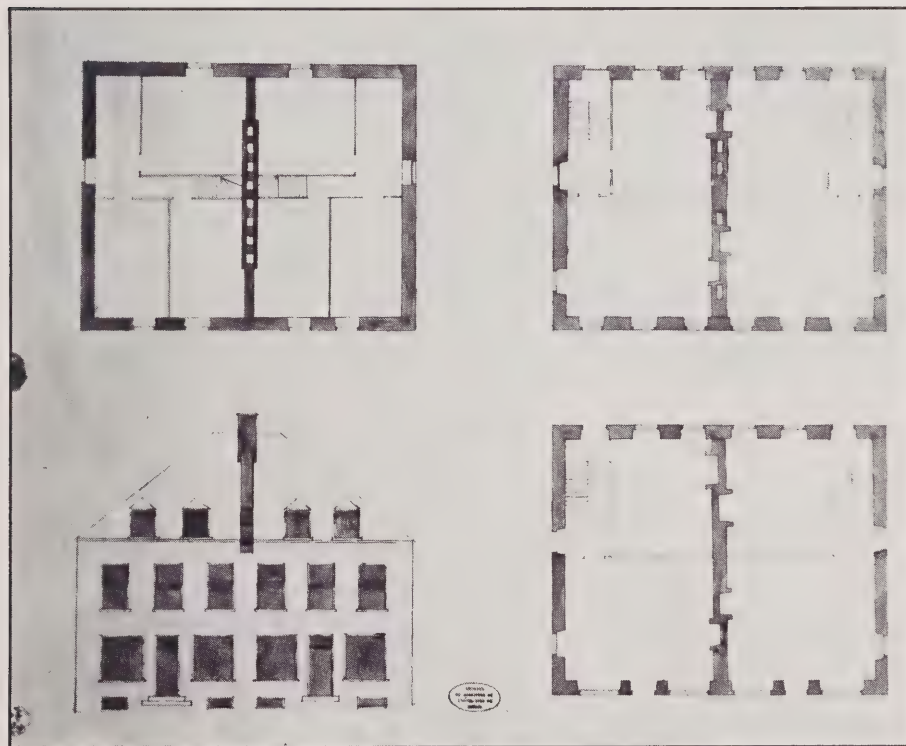
Fig. 2. Design for the façade of Notre-Dame cathedral, by Gaspard Chaussegros de Léry (1692–1756). Simple draft with a more elaborate draft superimposed by means of an overlay. Aware of the limited financial resources of the church council, the architect provided for the completion of the plan in two stages. The main work, shown in the simple draft at right (and later completed) was to be followed by a more elaborately ornamented façade, shown above. The use of an overlay showed the client the potential of the first stage of the project as a step in the process, and not as an end in itself. (Archives of Notre-Dame parish, Quebec City)

architect. By giving us a pictorial record of the old structure, destroyed in 1759, this drawing also allows us to explain the role of the cathedral as model for the design of numerous parish churches in New France. As well, we can compare this rough sketch with a more elaborate plan of the façade in order to discover the architect's original intention and to observe how closely he followed the formulae of classical French architecture of the 17th century.

It must be pointed out, however, that museums generally display to the public "fine drawings", that is, works chosen for their aesthetic qualities. An examination of such qualities leads to observations about technique (line, colour, paper quality, and so on) and about the manner in which the architectural forms are represented. The drawing can thus be viewed as a work of art produced by an artist concerned with composition and the rendering of the subject. As with painting or sculpture, we can retrace the style of a designer such as architect François Baillairgé in, for example, his wash of the baldachin of Notre-Dame cathedral in 1787 (fig. 3), and can notice the influence of the training in drawing and painting he received at the Paris Academy between 1778 and 1781. Continuing along these lines, it becomes easy to find a correspondence between the manner in which a building is constructed and the manner in which its creator depicts it. The structure proposed for the Hôtel-Dieu in 1829



Above: Fig. 3. Drawing for the baldachin of Notre-Dame cathedral, 1787, by François Baillairgé (1759–1830). At first glance, this drawing could be considered the work of an artist. However, François Baillairgé is also seen to be following the rules of architectural design prevalent in his time, by using a flat projection instead of a perspective view and by omitting the structure in which the baldachin is to be placed. (Laval University Archives, Chenevert Foundation)



Left: Fig. 4. Plan for the building for the Hôtel-Dieu in Quebec City, 1829, by Thomas Baillairgé (1791–1859). After an analysis of its style, this unsigned drawing has been attributed to Thomas Baillairgé. It is a preliminary sketch of the concept of a building which will be transformed and adapted with a more detailed drawing and written specifications. The architect presented this preliminary project sketch to which the client and the building contractor were to respond. (Archives of the Augustinian convent of the Hôtel-Dieu)

by Thomas Baillairgé is very strictly symmetrical, for example, in the design of the façade and the arrangement of the interior divisions, and the various drawings of the plan reproduce this arrangement (fig. 4). On the other hand, the architect of a 1910 plan for a railway station thought it appropriate to have Louis Morency paint an actual picture showing the picturesque site in Quebec City which the style of the proposed building was supposed to enhance (fig. 5). In both cases there is a correspondence between the building and the manner in which it was depicted on paper.

Looking at the architectural drawings on these various levels enables us to get to know them better and thus to explain them. If, for example, we know that in ground plans of the 17th and 18th centuries the walls of proposed structures are touched up with a yellow-ink wash and that those of an already existing building are red, we can distinguish the proposed structures from those already built, which are set off in the brighter colour. Furthermore, by getting to know the ar-

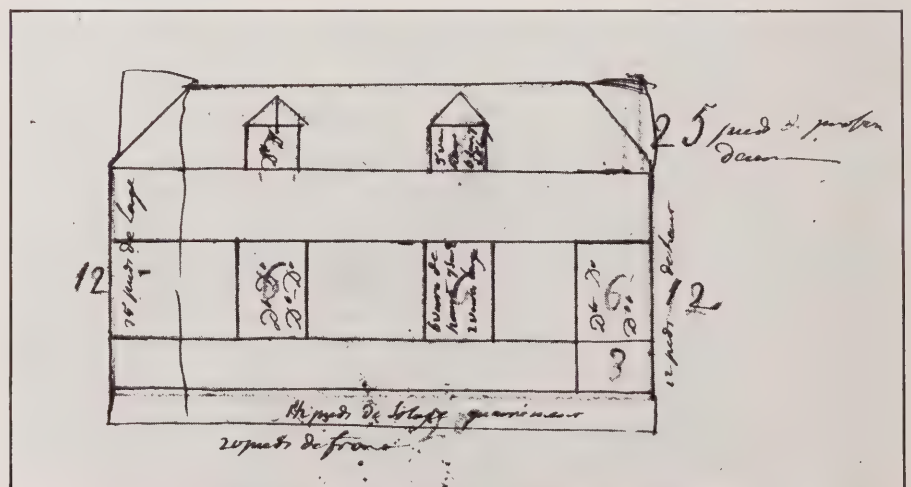


Fig. 5. Plan for a railway station, 1910, by Louis Morency (active ca. 1900–1915). Because architectural drawings had become more and more technical and detailed since the end of the 19th century, the architect used the assistance of a professional artist in order to provide at least one overall view of his plan. When favourable public opinion was sought, an impressive presentation was a help, especially in this case, where the proposed building would have required the demolition of the entire Place Royale section of the city. (Private collection)

chitect's manner of drawing through his works, we can easily enough attribute to him works that are often not signed and sometimes not dated.

All these approaches to the drawings already give us very interesting information, but the research that has gone into the preparation of the exhibition "L'art de l'architecte" has taken us farther still. Through the drawings on display we have tried to discover the portrayal of an architectural method. The architectural drawing displays a plan. The person who created it is the narrator; sometimes he is a recognized architect, sometimes an individual who has become involved in the project through particular circumstances. The drawing re-

Fig. 6. Design for a wooden house in the suburb of Saint-Louis, 1820, anonymous. The author of this draft uses it only to specify what he considers important. The other elements of the plan must therefore be known to the building contractor: those details have all been omitted because they belong to a traditional, established form of architecture which is modified only by the details drawn in the draft. (Quebec National Archives)



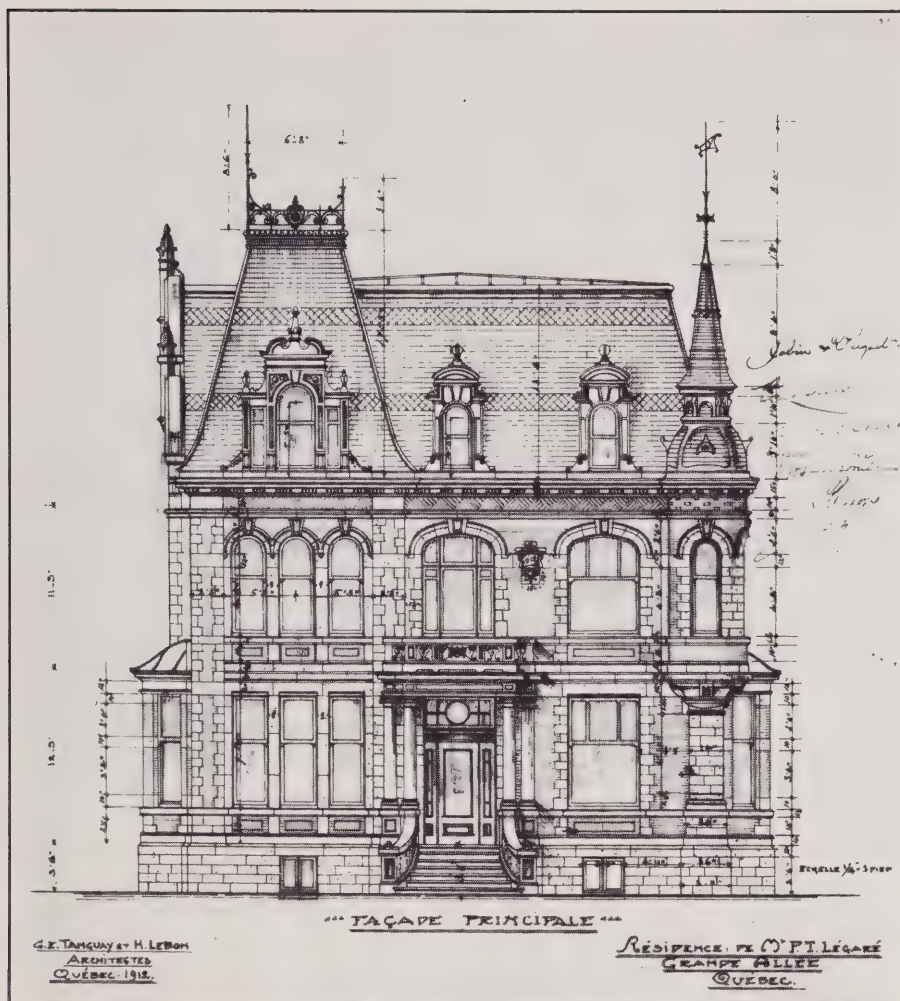


Fig. 7. Plan for the residence of Mr. Légaré on the Grand-Allée, 1912, by Georges-Emile Tanguay and Hector Lebon. (Laval University Archives, Chenevert Foundation)

veals its author's intentions, but also conveys all that is accepted practice at the time as well as the client's specific requirements. Consequently, the drawing reveals as much by what it does not show as by what it does show. It is quite obvious that in 1820, the author of a plan for a wooden house in the suburb of Saint-Louis was interested only in the positioning and size of the windows (fig. 6); the rest of the construction was a matter of traditional style and know-how. By contrast, in 1912, architect Georges-Emile Tanguay leaves nothing to chance. Out of all the designs and materials at his disposal, he himself chooses for his client the type of architecture and determines specifically how his plan is to be carried out (fig. 7). In this instance, traditional know-how of architectural designs and construction does not serve as a record of the designs and techniques stored in his memory, and is limited to its use in the specialization required in that period.

Reading between the lines in this way, we can classify architectural drawings into categories which vary in importance according to the period and therefore reveal the role, now subdued, now dominant, of the architect, since it is through his skill in drawing that he justifies his existence and the emergence of his profession. In time, architects have been establishing more and more forcefully the necessity of graphic plans for constructions and have then laid claim to exclusive production rights of these designs.

Seen in this perspective, architectural drawing becomes a powerful revelation of architecture itself and opens new avenues of thought and research. Furthermore, whether ancient or recent, architectural drawing gains the status of other works of art that museums exhibit because it has a wide range of meaning. These drawings present an important aspect of historical architecture which existing buildings cannot explain by themselves.

Luc Noppen is professor of architectural history at Laval University in Quebec. He is co-author of the catalogue which accompanies the exhibition "L'art de l'architecte" and is the author of numerous other publications on Quebec architecture.



Two Indonesian batiks: a shoulder cloth (above right) and a bed valance (left).

Through the generosity of the Textile Endowment Fund Committee the Museum has been able to acquire a collection of five Indonesian batiks, which are resist-dyed cottons. All were made in the north coast region of Java; their makers drew heavily on foreign design sources, an indication of the region's wide-ranging commercial ties.

Two of the batiks, including the bed valance illustrated here, were made for local Chinese merchant populations. Chinese-style lions and vases of flowers are identifiable on this batik, although they have been considerably altered. The format—a horizontal valance either fitted across the edge of a mattress frame or hung from a canopy frame—is also traditionally Chinese. The bird-on-flowering-branch theme featured on a shoulder cloth is derived from Chinese art, in this case probably through the intermediary of India. This fabric is displayed in the "Silk Roads · China Ships" exhibition.

The Textile Endowment Fund was founded in 1975 by a generous gift from Mrs. Edgar G. Stone. Since then a small and active committee has increased the fund through lecture series, interest on investments, solicitation of donations, and the raffle and sale of especially designed and stitched needlepoint rugs. The aim of the Committee is to draw attention to the outstanding collections of the Textile Department.

J.E.V.

The Department of Mammalogy has recently received a donation of twenty-five manatee (*Trichechus manatus*) skeletons from the U.S. Fish and Wildlife Service in Gainesville, Florida. The manatees and dugongs are the only surviving members of the Order Sirenia. These large mammals were the basis of the mermaid myth and have been hunted since the 17th century for their meat and hides, and also for their bones which were used as a substitute for ivory. As a result, their numbers have declined to the point where they are now on the endangered species list. They are protected throughout their range (southeastern United States, west to Texas and the West Indies, and the adjacent mainland from Veracruz, southward to northern South America), but poachers and vandals, and also power boats, are responsible for many deaths. In Florida, efforts are being made to establish a National Manatee Refuge. The ROM's specimens were salvaged from dead animals found by the Fish and Wildlife Service research team. This donation represents a significant contribution to the Department's marine mammal collection.

N.G.



A manatee skeleton, reminder of the mermaid myth.

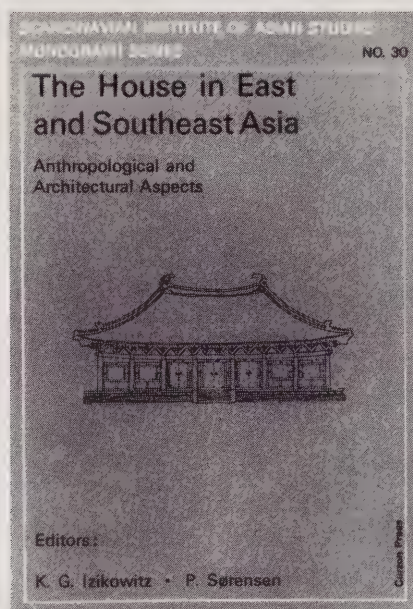
A fossil of the Silurian crinoid *Macrostylocrinus ornatus*. The circle encloses the regenerated area; the bar represents one centimetre for scale.

Many members of the large and varied group of invertebrates known as Echinodermata ("spiny-skinned" animals) possess an extraordinary ability to replace lost, injured, or cast-off parts. There are species of starfish, for example, that can regrow an entire animal from one severed arm and a portion of the central disc. Some sea cucumbers are able to regenerate their whole system of internal organs after their viscera have been expelled for defensive purposes.

In a recent purchase of fossils, the Department of Invertebrate Palaeontology obtained a complete individual of the Silurian crinoid *Macrostylocrinus ornatus* (420 million years old) displaying one partly regenerated arm. This unusual specimen shows that some fossil echinoderms also possessed the enviable powers of replacement shown by their modern descendants. It is impossible to determine whether the crinoid was a victim of predatory attack or merely lost part of its arm through mechanical injury or disease. Whatever the cause of the damage, the tiny regrowing stub indicates that recovery was well underway just prior to death, when the entire animal was rapidly buried and preserved in fine mud.

D.M.R.





The House in East and Southeast Asia: Anthropological and Architectural Aspects

K. G. Izikowitz, P. Sørensen (eds.)
*Scandinavian Institute of Asian Studies
Monograph Series 30*
in Canada, P. D. Meany
197 pp. \$19.50 (paper)

Review by Edward S. Rogers,
curator-in-charge of the ROM's
Ethnology Department.

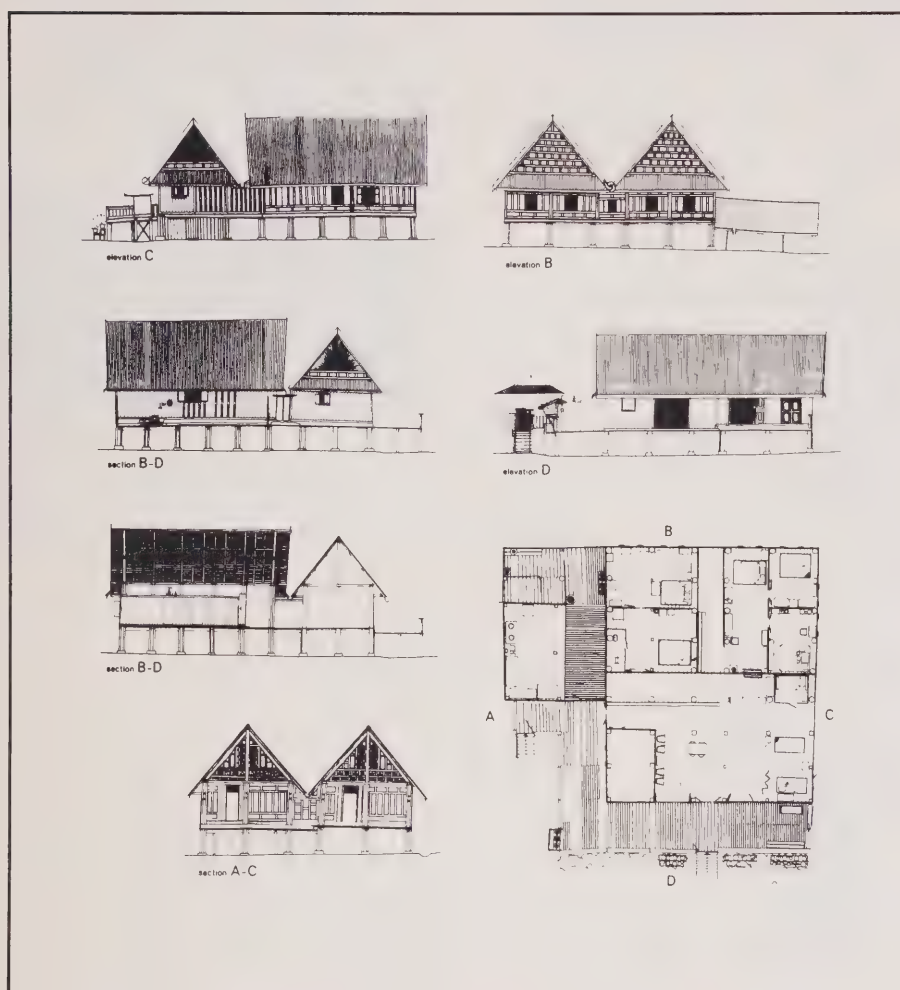
In 1975 a symposium devoted primarily to peasant dwelling houses of Southeast Asia was organized in Gothenburg, Sweden, by the Scandinavian Institute for Asian Studies. The participants, from universities and museums in France, Sweden, Norway, and Denmark, each presented one or more papers dealing with housing constructed by present and former inhabitants of Southeast Asia, Nepal, the Celebes, the Philippines, and Madagascar. All but one of the papers presented at the conference are printed in this volume.

The papers represent field work conducted mainly during the decade prior to the meeting in

Gothenburg, and together they give a good insight into the investigations West Europeans have been making of dwellings occupied by subsistence herders and farmers, a topic that should be of interest to ethnologists, especially those associated with museums. (Temple architecture and urban structures, past or present, are not considered.) The investigators have attempted to go beyond "form and function" and to understand these in terms of the social and ritual life of the people, but judging by the published papers, the attempt does not appear to have been entirely successful.

In addition to a preface by P. Sørensen and an introduction by K. G. Izikowitz, co-editors of the volume, there are eighteen papers by fifteen contributors. As the papers are primarily descriptive, a reviewer—especially one not intimately familiar with the area—can do little more than note the contents of the chapters. The first two chapters, by Sørensen and N. A. Henriksen, deal with archaeological finds of floor plans of long-vanished houses. The third chapter, by E. Glahn, presents a most illuminating outline of Chinese building techniques employed throughout several centuries, a marvel of prefabricated house construction. There follows a short note by L. Bernot on the utilization of space in the houses of swidden farmers. Bernot then goes on to contrast the two-door house of the Burmese peasant with the Iroquois Long House as described by Lewis Henry Morgan nearly 150 years ago.

In the following three chapters, the first by S. Charpentier and the other two by P. Clement, the Lao house is described and compared with other types, and the spatial organization within the dwelling is discussed. Types of houses in Thailand are the subject of the next three chapters by J. R. Thomsen, H. Haagensen, and L. R. Pedersen, the last of whom investigates the sacred nature of the interior of the



From *The House in East and Southeast Asia: an architectural survey from Lampang, Thailand*.

dwelling and its implications for the technology of house construction.

Shelters of the Celebes and of the southern Philippines are dealt with by W. Lundstrom and I. Wulff respectively, and housing in Nepal in two chapters by C. Milliet-Mondon; a third chapter on Nepalese housing is by C. Corlin, who is interested, as are many of the others, in the spatial arrangements within the house and within the village. Finally, Madagascar dwellings are discussed, first by O. C. Dahl and then by D. Couland.

Although subtitled "Anthropological and Architectural Aspects", the book contains little evidence of an anthropological approach to the subject of housing, certainly from a

North American anthropological perspective. The contributors appear to be following the French school of geographers represented by such scholars as Brunhes and de la Blanche. Socio-political organization is poorly presented and apparently not well understood. For example, what is meant by the term "nieces"—parallel or cross? And why not state that *adat* means customary law? Occasionally the phraseology is unclear, and there are many typographical errors. The volume is profusely illustrated with photographs and drawings. The result is an interesting book on housing, but one that lacks substance, or insights that would further one's understanding of the function of dwellings.



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Battle for the West

Fur Traders and the Birth of Western Canada



Daniel Francis

\$9.95

Battle for the West

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Hurtig Publishers

191 pp. \$9.95 (paper)

Review by Walter A. Kenyon, author of *The Grimsby Site: A Historic Neutral Cemetery*. Dr. Kenyon was curator of Canadian archaeology, Department of New World Archaeology at the ROM until his retirement in 1982.

Battle for the West deals primarily with the economic rivalry between the Hudson's Bay Company and the various traders from the St. Lawrence valley. It was a long and acrimonious struggle that lasted from the founding of the H.B. Co. in 1670 to its amalgamation with the Northwest Company in 1821. It is, in many ways, a familiar story, having been told many times over the years. Originally it was told by the traders and explorers themselves in a remarkable series of journals. But as Daniel Francis points out in his introduction, "... for the general reader, many of the classic texts sink under the weight of their own detail".

What Francis has done, then, is to strip away much of this detail, and to present the various stories so that they stand forth with refreshing clarity. Crisp, lucid prose carries the

reader safely and pleasantly through some turbulent historic eddies. The major figures are all present, however, and much of the drama is unfolded through quotations from the actors themselves. The result is a thoroughly delightful volume that combines historical accuracy with narrative elegance.

A relatively short time ago prevailing wisdom had it that "the only good Indian was a dead Indian". Then by some strange alchemy, the situation was reversed. Today, all Indians are good Indians. How this sudden reversal has come about need not concern us here. What *is* important is the fact that both views are distortions that are unsupported by any reality, either historical or current. They are related only to the ambient sentiments of the periods in which they flourished.

The *actual* position of the various Indian groups in the battle for the west has rarely been examined in any detail. When Francis addressed himself to this problem he found that the Indians were profiting from the fact that two different companies were competing for the same furs. Inevitably—and to the advantage of the Indians—prices were forced upwards. The western trade, that is, was shared between the rival companies in ways that were convenient to the Indians rather than to the traders themselves. In fact, the Indian was a very poor consumer. From a European viewpoint, his motivation was defective. It was a recurring complaint that "... the western Indians would rather hunt buffalo, steal horses, and make war than produce furs for the white man".

With the amalgamation of the Hudson's Bay Company and the Northwest Company in 1821, the situation changed abruptly. The newly established monopoly made it impossible for the Indian to control the fur trade by playing one group off against the other. With the end of competition, the Indian's bargaining power simply evaporated.

In summing up this particular theme (for there are, of course,

several others) Francis makes the following comment: "Actually, for both Indian and Métis, the trade was much less exploitive than it might have been. One only has to look at the experience of other European nations in America, notably the Spanish in Latin America, to recognize that the fur trade was a relatively humane enterprise."

But Francis, too, finally succumbs to the prevailing wisdom, the ambient sentiments of today. On his last narrative page he says: "The trade was a classic example of foreign ownership and exploitation of Canada's natural resources . . ." Conditions being what they were towards the end of the 17th century in western Canada, one wonders what other scenario would have been possible.

But this is really a minor quibble, and should be accepted as such. For Daniel Francis has written an excellent book.

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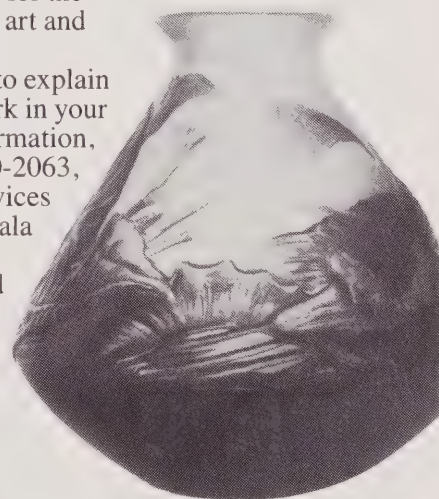
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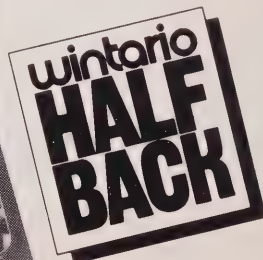
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Flowers of the Wild: Ontario and the Great Lakes Region

Zile Zichmanis & James Hodgins
Oxford University Press
272 pp. \$35.00 (cloth)

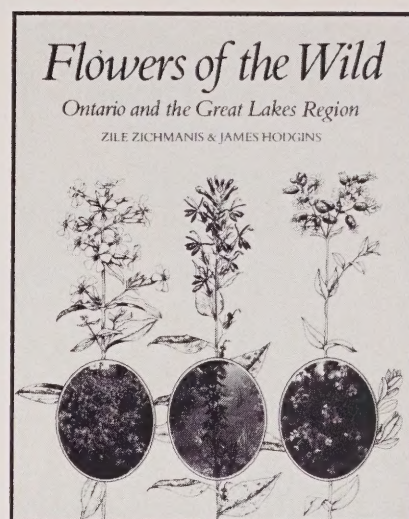
James H. Soper is co-author with Margaret L. Heimbürger of *Shrubs of Ontario*, and is curator emeritus of the National Museum of Natural Sciences.

Flowers of the Wild is a large attractive coffee-table volume covering a selection of 127 flowering plants found "in the wild . . . mainly in the southern third of Ontario" and in other parts of the Great Lakes region, as indicated by the subtitle. Line drawings by Zile Zichmanis occupy the left-hand pages as full-page figures with a colour print and relevant text by James Hodgins on each facing page. At first glance, the reader may wonder about the justification for duplicating the illustration. In fact, it could be argued that this is essentially two books sharing one text. However, the two very different methods of illustration are complementary. The excellent drawings show the botanical features of the plants (with commendable accuracy), and the colour plates show their colours and, in many cases, their habitats as well. Whereas the colour plates may show the plants either in flower or in fruit, the drawings often illustrate both stages.

The inclusion of habitat in many of the colour plates is a pleasing feature too often omitted in the close-up illustrations in wildflower books. Here we see day lily growing in a cemetery, bittersweet nightshade on a backyard fence, cut-leaved toothwort and others in woodland, pickerelweed, common cattail and others in their aquatic environment, and evening lychnis on what appears to be the campus of the Ontario Agricultural College. While most of the colour plates are of high quality, there are a few (e.g. the illustration of flowers of chicory on page 59) in which the colour is not true to nature.

The two main weaknesses of this

book are the arrangement of species and the uneven coverage given to the flowers which occur in the wild of Ontario. The species have been arranged in alphabetical order of their common name, from agrimony to yellow mandarin. The common names are said to have been taken for the most part from a field guide by Peterson and McKenny. Unfortunately, an adjective preceding the main name has been used in the ordering process, resulting in so artificial and haphazard an arrangement as to be both pointless and confusing. To give just two examples out of many: false Solomon's seal is on pages 98–99, star-flowered Solomon's seal (with an extra drawing of three-leaved Solomon's seal, *Smilacina trifolia*, the latter not indexed) is on pages 216–217, while the closely related (true) Solomon's seal is on pages 208–209. Again, to find Ontario's



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floral emblem, the trillium, it is necessary to consult the index, since trout lily and twinflower are the only species in the "T" section. It can be found under white trillium (pages 228–229) and the drawing has three additional Ontario species of that genus. How much simpler it would have been to put these under trillium, if indeed one must arrange them by common names! But some other arrangement—by family, for example—would have been even better.

The selection of species covers a wide range of plant families but is not truly representative of the flora of southern Ontario. Of the 61 families represented, 43 have only one genus illustrated, 9 have two genera, 4 have three genera, and those with more examples are the arum and rose families (5 genera), buttercup family (8), aster family (17) and lily family (18 genera, one with three species shown). In contrast to the last two important

families, some others have a poor representation: for instance, there are only two genera from the bean family and three each from the mint, orchid, and snapdragon families. Many of our common herbaceous wildflowers are not treated or even mentioned. Conspicuous by their absence are violets (blue, white, and yellow species), evening primroses, euphorbias, pyrolas, monkey-flower, louseworts, gerardias, veronicas, beard-tongue, turtlehead, blue lobelias, sunflowers, tickseeds, groundsels, thistles, rattlesnake plantain, wild peas, vetches, tick-trefoils, hog-peanut, groundnut, and most of the orchids: rose pogonia, arethusa, grass-pink, calypso, coral-root, and twayblade. There are no roses—the introduction states that "Flowers of woody plants are largely excluded because they tend to be less conspicuous (though still intriguing subjects for study)". Yet surely our wild roses are more conspicuous than floating pondweed, Russian thistle, lamb's quarters, and several other species that are included. The result of the omission of so many common wildflowers will mean inevitable frustration for those who pick up the book with the idea of using it to identify wildflowers in southern Ontario or the Great Lakes Region.

Few typographical errors were noted in the text but there are several instances of incorrect spelling of scientific names: (*Iris pseudoacorus* for *pseudacorus*; (*Asclepias tuberosus* for *tuberosa*; (*Uvularia sessifolia* for *sessilifolia*; (*Scutellaria latifolia* for *lateriflora*; (*Acer pennsylvanicum* for *pensylvanicum*).

On the whole, the excellent drawings and colour plates form the main attraction of this book. The text is brief but adequate, but with inconsistencies in depth of treatment and in the cross-referencing of similar species. In spite of the shortcomings noted, I am sure that many libraries and those individuals who can afford the price will want this attractive volume.

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